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WHITE PAPER

ECONOMIC AND LAND USE OUTLOOK — SAN FRANCISCO BAY AREA REGIONAL RAIL PLAN

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February 2006

EPS #15023

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EXECUTIVE SUMMARY

PURPOSE AND SCOPE

This White Paper examines the long-term economic and land use outlook for the San Francisco Bay Area as input to the Metropolitan Transportation Commission's (MTC's) Regional Rail Plan Study. The purpose of this Paper is two-fold: (1) to provide an economic and land use context in which to formulate an initial list of regional rail network alternatives, and (2) to raise specific economic and land use considerations from which evaluation and screening criteria can be generated and subsequently applied to the initial list of Study alternatives.

There are two fundamental questions that this Paper aims to address. First, how will the Bay Area accommodate its future population and job growth? And second, what are the implications of this growth for defining and evaluating regional rail plan alternatives? In addressing these questions, the Paper consists of the following primary chapters:

- **Regional Socio-Economic Overview.** This chapter provides baseline economic and demographic information for the Bay Area, and from this context, considers the economic and land use potentials of the region over the long-term horizon. It provides an analytical discussion of the outlook through an approach that is data-, policy-, and issue-oriented.

- **Land Use Framework.** This chapter provides a framework of potential economic and land development patterns, including: (1) development in the urban center of the Bay Area, termed urban infill "core" development; (2) development in outlying Bay Area counties stemming from their connection to the urban center, termed urban-suburban "hub and spoke" development; and (3) development in outlying Bay Area counties stemming from their connection to one another, termed regional "web" development. These development patterns are not presented as alternatives but rather as a way to systematically evaluate the economic and land use considerations of various rail alternatives.

- **Regional Land Use Policies and Programs.** This chapter provides a detailed survey of regional land use policies and programs aimed at addressing many of the growth challenges confronting the Bay Area. It highlights the existing policies that should be considered in the establishment and evaluation of passenger rail improvements and expansions.

- **Recommendations for Screening Criteria.** This chapter builds from the dual foundation of the economic/land use outlook and land use policies, culminating in a recommended set of economic and land use screening criteria for regional rail alternatives. It establishes screening criteria to be consistent with economic

and land use outlook realities and in harmony with the objectives of regional land use policies and programs.

- **Conclusion and Further Issues.** This chapter summarizes the key points of the Paper and addresses issues beyond the Paper's immediate scope that may present important considerations in the formulation of regional rail plan alternatives and screening criteria.

REGIONAL SOCIO-ECONOMIC OVERVIEW

BASELINE ECONOMIC AND LAND USE GEOGRAPHY

The 9-County Bay Area is home to more than 6.9 million people, two thirds of whom live in the Inner Bay Area comprised of San Francisco, San Mateo, Santa Clara, and Alameda counties. Expanding the 9-County Bay Area to include the outlying counties of Santa Cruz, Monterey, and San Benito to the south and San Joaquin, Stanislaus, and Merced in the Northern San Joaquin Valley, this Greater Bay Area population stands at 9.0 million.

The vast majority of regional jobs (60 percent) are located in the Inner Bay Area. Even with a moderate decline over the last decade, the Inner Bay Area share of jobs remains much greater than its share of the working age population. In fact, when comparing the number of jobs in the Inner Bay Area to the number of its employed residents, this imbalance increased notably from 1990 to 2000—from 1.1 to 1.2 jobs per employed resident. For the 9-County Bay Area as a whole, the ratio was 1.1 in 2000, reflecting 300,000 more jobs than employed residents.

Despite having relatively high development densities, the 9-County Bay Area suffers from a chronic housing shortage. The lack of adequate housing supply has contributed to higher housing cost burdens, disproportionate impacts on low-income renters, overcrowded housing units, and substantial increases in commuter times and distances. Workers have moved further out from job centers in search of affordable housing, making transportation issues a focal point for regional development.

ECONOMIC AND LAND USE PROJECTIONS

Forecasters expect the 9-County Bay Area population to grow by about 2.0 to 2.3 million for the period 2000 to 2030. They further expect 1.0 to 1.5 million persons to be added in the six Greater Bay Area counties. There is considerable variation in the pattern of expected population growth at the sub-regional level. This variation is explained in part by differences in trends-based projections (e.g., CA DOF), which capture relatively more growth in outlying counties, and policy-driven projections (i.e., ABAG 2005), which shift new growth toward transit and existing urban cores.

Job growth projections also vary widely from 800,000 to 1.4 million for the 9-County Bay Area for the period 2000 to 2030. Forecasters expect 350,000 to 400,000 jobs to be added in the Greater Bay Area counties. In contrast to the population forecasts, forecasters are in general agreement that job growth will be concentrated in the Inner Bay Area.

Together, the population and job forecasts present notable differences for the future of the jobs-housing balance. Unsurprisingly, the trends-based projections suggest a growing imbalance. ABAG's policy-driven forecast bucks this trend, but does little more than maintain the status quo of the imbalance. For the entire 9-County Bay Area as a whole, there will remain 1.1 jobs for every employed resident over the forecast horizon, implying a continued influx of workers into the area from outlying counties.

In addition to the hard numbers provided by forecasters, there are several over-arching issues, or themes, to keep in mind in making an informed assessment of the Bay Area outlook. First, dramatic demographic shifts, including an aging population and growing Hispanic population, may present skill-match challenges for Bay Area employers. Further, structural changes in the U.S. economy, including the decline in manufacturing employment, may produce displaced workers and/or prompt firms to leave the area or reconfigure their operations. Finally, the uncertain energy outlook presents issues for the cost of doing business, the cost of living, the level of global integration, and future commute and transportation patterns.

LAND USE FRAMEWORK

The population and job forecasts and the overarching economic and demographic outlook issues present a range of possible futures for the Bay Area. To address the wide variation in potential outcomes, this chapter is devoted to critical analysis of possible spatial development patterns in the Bay Area, defined as: (1) urban infill "core" development; (2) urban-suburban "hub and spoke" development; and (3) regional "web" development.

URBAN INFILL "CORE" DEVELOPMENT

Development opportunities in the Inner Bay Area over the long-term horizon will be increasingly tied to infill development – building homes, businesses, and public facilities on vacant or underutilized lands within existing urban areas. For the purposes of this Paper, we define urban infill "core" development as infill development within Inner Bay Area counties. The extent to which future regional development is represented by urban infill "core" development is largely contingent on the employment and land use outlooks for the Inner Bay Area.

In terms of employment, the outlook is generally positive. Job growth will likely be driven by continued creation of new businesses in existing and emerging technology clusters, and in a wide range of service-providing industries. The Inner Bay Area will continue to be a strong place to start a business, but it may not capture the bulk of jobs as companies mature and expand.

On the land use side, studies have shown that a nontrivial amount of land is available in the Inner Bay Area for infill development, particularly for redevelopment of underutilized or transitioning areas. The market potential for infill development in the Inner Bay Area is also positive. But despite evidence of land availability and market potential, there are a variety of obstacles to infill development, including affordable housing challenges and the high cost of production and land, among others. Yet, there exists a growing foundation of support for infill development initiatives from local governments, advocacy groups, nonprofit developers, and transportation agencies alike.

Implications for Regional Rail Plan

The spatial development pattern of urban infill "core" development presents unique considerations for regional rail plan alternatives and screening criteria. In particular, the prospect of infill development in the Inner Bay Area implies that strong consideration should be given to enhancing the existing core rail network, with focus on: (1) system capacity; (2) system maintenance; (3) infill stations; (4) inter-modal stations; and (5) feeder services and linkages to light-rail and bus networks. This development pattern also raises important considerations with regard to the alignment of high-speed rail into the Inner Bay Area. These include: (1) prioritization of employment centers; (2) duplication of rail infrastructure; and (3) station locations.

The following key rail corridors outlined by Earth Tech, Inc. relate to the urban infill "core" development pattern:

- **Corridor 4:** San Francisco – Santa Clara (Caltrain Corridor)
- **Corridor 6:** Alameda – Santa Clara (East Bay Corridor)
- **Corridor 7:** San Francisco – Alameda; San Mateo – Alameda (Transbay Corridors)

URBAN-SUBURBAN "HUB AND SPOKE" DEVELOPMENT

Even if a nontrivial amount of urban infill "core" development occurs, future development in the region will to some degree reflect continued suburban development. For the purposes of this Paper, we define urban-suburban "hub and spoke" development as development of residential-intensive communities with a commuter culture in Bay Area counties that surround the Inner Bay Area employment hub. The extent to which future regional development is represented by urban-suburban "hub and spoke" development is contingent on a variety of factors that include the

employment outlook of the Inner Bay Area and surrounding counties and the extent to which infill development occurs within the Inner Bay Area and in the existing suburban footprint.

Currently, there are several key corridors that constitute significant inter-county worker flows from outlying counties into the Inner Bay Area. These workers reside in the following counties and county-clusters:

- **Sonoma and Marin counties**
- **Contra Costa County**
- **Solano County**
- **San Joaquin, Stanislaus, and Merced counties** (Northern San Joaquin Valley)
- **Santa Cruz, Monterey, and San Benito counties** (South Bay Area)

The majority of jobs in these counties are concentrated in population support industries, complemented by unique industry presences in agriculture and related manufacturing and services, tourism, and transportation and warehousing. That said, there is a growing presence of employment centers in these outlying counties with industries that have historically been represented in the Inner Bay Area, such as high-tech manufacturing firms in Sonoma County and biotechnology and financial service companies in Solano and Contra Costa counties. Growth in these types of employment centers is likely to continue over the long-term horizon, but not to an extent that will shift the employment center of gravity from the Inner Bay Area.

The issue remains whether accommodation of regional population growth will occur within the existing suburban footprint or through an expanding suburban footprint. Urban growth boundaries and heavy commercial/industrial zoning, which are aimed to limit residential sprawl and encourage employment growth, can have the effect of restricting needed residential development. Without the production of affordable housing within existing suburbs' boundaries, the trend of low-density residential development in "leap frog" locations will continue, contributing to more numerous and longer suburban spokes.

Indeed, the degree to which future development in the Bay Area is characterized by "hub and spoke" depends in part on the level of infill development within the existing suburban footprint. Studies have shown that land is available for suburban infill development, but market potential in these areas may be more limited and obstacles more formidable than in the Inner Bay Area. Still, advocacy for infill development initiatives is far-reaching across the Bay Area.

Implications for Regional Rail Plan

The spatial development pattern of urban-suburban "hub and spoke" development presents unique considerations for regional rail plan alternatives and screening criteria. In particular, the prospect of "hub and spoke" development implies that strong consideration should be given to connection points between outlying counties and the core rail network in the Inner Bay Area. Consideration should also be given to promoting transit-oriented infill development within the existing suburban footprint. Key rail alignment issues include: (1) inter-modal station connection points; (2) suburban infill stations; (2) system capacity of existing/committed commuter rail; and (4) new commuter rail alignments. This development pattern also raises important considerations with regard to the alignment of high-speed rail into the Inner Bay Area. These include: (1) potential commuter service; and (2) duplication of rail infrastructure.

The following key rail corridors outlined by Earth Tech, Inc. relate to the urban-suburban "hub and spoke" development pattern:

- **Corridor 1:** Sonoma/Marin – Inner Bay Area (SMART Corridor)
- **Corridor 2:** Solano – Inner Bay Area (Capitol Corridor)
- **Corridor 3:** Napa – Inner Bay Area
- **Corridor 5:** Santa Cruz/Monterey/San Benito – Inner Bay Area
- **Corridor 9:** N. San Joaquin Valley – Inner Bay Area
- **Corridor 10:** Solano/Contra Costa – Inner Bay Area

REGIONAL "WEB" DEVELOPMENT

In addition to suburban development around a central employment hub, suburban development can also be characterized according to its relation to other suburbs. As the Bay Area has grown in size and competitiveness as a region, among the key trends affecting development patterns have been linkages that have grown between sub-regional centers and among industries. For the purposes of this Paper, we define regional "web" development as development in outer Bay Area county clusters that is closely tied to unique industry and geography as well as budding employment centers.

There are four main county clusters in the outer Bay Area that display notable worker flows within them:

- **Sonoma, Marin, Napa, and Solano** counties in the North Bay Area
- **Contra Costa, Solano, and Marin** counties to the east and north of the Inner Bay Area
- **San Joaquin, Stanislaus, and Merced** counties in the N. San Joaquin Valley
- **Santa Cruz, Monterey, and San Benito** counties in the South Bay Area

The extent to which future Bay Area development is represented by regional "web" development is contingent on the employment outlook and patterns of land use within these county clusters. The future level of worker flows within these county clusters hinges on the level of labor-intensive economic interaction between counties. Agriculture-related industries in these counties are unlikely to be significant job generators going forward, but rather meet demand and fuel growth through productivity gains. Increases in labor-intensive interaction will depend on growth in employment centers that are represented by growth-driving industries, such as high-tech and professional service industries in the North Bay and Contra Costa County, and transportation and warehousing in the Northern San Joaquin Valley.

Even more basic to this development pattern is the degree to which these outlying counties accommodate the region's future population growth. Should most of the region's population growth occur in these county clusters, as current trends suggest, then regional "web" development is more likely to be a dominant spatial development pattern. This development pattern has important implications for regional land use patterns, with farmland and local land use policies as key focal points.

Implications for Regional Rail Plan

The spatial development pattern of regional "web" development presents unique considerations for regional rail plan alternatives and screening criteria. In particular, the prospect of "web" development implies that strong consideration should be given to connecting employment centers in outlying counties. Consideration should also be given to promoting TOD and farmland conservation. Key rail alignment issues include: (1) new commuter rail alignments; (2) connection points between: (a) new rail alignments and the INNER core rail network, (b) new rail alignments and existing/committed OUTER rail alignments, and (c) already existing/committed rail alignments; (3) locations of inter-modal stations; (4) locations of high-speed rail stations in the Northern San Joaquin Valley; and (5) capacity and maintenance of existing/committed commuter rail that serve county clusters. The regional "web" development pattern also raises important considerations with regard to high-speed rail alignments into the Bay Area, including: (1) potential commuter service; and (2) linkages to freight movement.

The following key rail corridors outlined by Earth Tech, Inc. relate to the regional "web" development pattern:

- **Corridor 1:** Sonoma – Marin (SMART Corridor)
- **Corridor 2:** Solano – Contra Costa
- **Corridor 3:** Solano – Napa – Marin (and Contra Costa)
- **Corridor 8:** San Joaquin – Stanislaus – Merced (N. San Joaquin Valley)
- **Corridor 10:** N. San Joaquin Valley – Contra Costa

REGIONAL LAND USE POLICIES AND PROGRAMS

This chapter compliments the economic and land use outlook discussion by providing a regional land use policy context from which to evaluate rail improvements and expansions. Over the past fifteen years regional agencies, and advocacy groups with an interest in regional problem solving, have developed land use policies aimed at addressing many of the growth challenges confronting the greater Bay Area. Policies identified are included in:

- ABAG's Land Use Policy Framework;
- Smart Growth/Regional Livability Footprint Principles; and
- MTC's Smart Growth Framework

ALTERNATIVE EVALUATION AND SCREENING CRITERIA

This chapter builds from the dual foundation of the economic/land use outlook and land use policies, providing a recommended set of economic and land use evaluation and screening criteria for regional rail alternatives. The evaluation and screening criteria are established so as to be consistent with both economic/land use outlook realities and policy initiatives. Screening and evaluation of rail projects will occur at a number of stages during the Study process, including: (1) in the development of regional rail plan alternatives and (2) in the refinement of specific alignments and modes within particular transportation corridors. In addition to the evaluation and screening criteria described below, it is assumed that issues of technical and financial feasibility will be incorporated at all levels of the alternative formulation process.

CONSISTENCY WITH REGIONAL LAND USE POLICIES
(to be ranked high, medium, or low)

1. Promotes development patterns that discourage long-distance automobile commuting, and increases resident access to employment, shopping and recreation.

2. Promotes development in already urbanized areas that will improve job-housing imbalances.

3. Supports service to, and expansion of, transit-oriented infill development (housing, employment and retail development in already urbanized areas that are within one-half mile of planned station areas).

4. Improves and maintains existing infrastructure, and promotes smart growth.

5. Maintains or enhances the existing core transportation network.

CONSISTENCY WITH CRITICAL LAND USE GOALS AND OBJECTIVES (to be ranked high, medium, or low)

Jobs-Housing Balance Criteria

6. Promotes housing opportunities in already urbanized areas that will improve job-housing balance.

7. Promotes employment opportunities in lower-cost suburban areas that will improve job-housing balance.

Economic Growth Criteria

8. Improves access between desired future major employment centers and labor force locations.

9. Improves access between budding employment centers in outlying areas.

10. Promotes growth in major regional economic industry sectors, e.g. high-technology sectors, tourism, transportation and warehousing.

11. Promotes access to and from major tourist-serving areas.

Transportation-Specific Criteria

12. Relieves existing and forecasted congestion on major highway corridors and prioritizes corridors with greatest current and projected commuter volume.

13. Prioritizes station sites and corridors with greatest TOD potential.

14. Promotes maximum capacity utilization of existing and already-committed passenger rail system.

15. Promotes efficient linkages: within the existing/committed core rail network; between outlying rail alignments and core rail network; and among outlying rail alignments.

Land Conservation Criteria

16. Minimizes greenfield development required by new rail alignments.

17. Minimizes growth inducing impacts on natural resources, open space, farm and ranch land.

Community Welfare Criteria

18. Improves access between low-income communities and major employment centers.

Policy-Specific Criteria

19. Links areas identified in the Smart Growth/Regional Livability Footprint Project.

20. Provides service to jurisdictions with adopted policies designed to focus growth toward already developed lands.

ISSUES FOR FURTHER CONSIDERATION

There are several issues beyond the immediate scope of this Paper that warrant on-going consideration during this study process. First is the general idea of how transportation infrastructure and improvements themselves might affect the composition and patterns of growth and land use going forward. Having an understanding of these types of effects potentially enables transportation planners and policymakers to steer regional growth patterns in a desired direction. Second is the relationship between transit modes or technology and regional land use patterns. For example, new rail alignments versus Bus Rapid Transit lines could have significantly different impacts on land use patterns. Third is the issue of phasing in the regional rail plan, noting that development patterns in the Greater Bay Area are likely to occur at varying rates and times over the long-term horizon. All of these issues may present important considerations in the formulation of regional rail plan alternatives and screening criteria.

I. PURPOSE AND SCOPE

PURPOSE

This White Paper examines the long-term economic and land use outlook for the San Francisco Bay Area as input to the Metropolitan Transportation Commission's (MTC's) Regional Rail Plan Study. The purpose of this Paper is two-fold: (1) to provide an economic and land use context in which to formulate an initial list of regional rail network alternatives, and (2) to raise specific economic and land use considerations from which screening criteria can be generated and subsequently applied to the initial list of Study alternatives.

This Paper is premised on the notion that economic development and land use policy are inextricably linked. On the one hand, economic and market forces play a deterministic role in land use patterns. On the other hand, land use decisions can influence economic development patterns, in some cases leading to significant regional macroeconomic effects, such as the jobs-housing balance of an area. Likewise, focused land use policy can help steer economic development patterns toward a desired outcome.

The interplay of economic development and land use is further linked to transportation infrastructure. Population and employment growth coupled with land use patterns drive the need for transportation improvements. On the flip side, transportation improvements affect the economic growth and land use potentials of the areas they serve by more efficiently linking jobs to housing and employment centers to one another and by providing opportunities for transit-oriented and infill development.

SCOPE

There are two fundamental questions that this Paper aims to address. First, how will the Bay Area accommodate its future population and job growth? And second, what are the implications of this growth for defining regional rail plan alternatives and screening criteria? In addressing these questions, the Paper consists of the following six chapters and a technical appendix:

I. Purpose and Scope
II. Regional Socio-economic Overview
III. Land Use Framework
IV. Regional Land Use Policies and Programs
V. Recommendations for Screening Criteria
VI. Conclusion and Further Issues

WHITE PAPER ORGANIZATION

Following this introductory chapter, **Chapter II** provides baseline economic and demographic information on the Bay Area, and from this context, it considers the economic and land use potentials of the region over the long-term horizon. However, the analysis does not culminate in a unique economic and land use forecast for the Bay Area. Instead, the chapter provides an analytical discussion of the outlook through an approach that is data-, policy-, and issue-oriented.

Chapter III builds on the outlook discussion to provide a framework of potential economic and land development patterns. This framework includes: (1) development in the urban center of the Bay Area, termed urban infill "core" development; (2) development in outlying Bay Area counties stemming from their connection to the urban center, termed urban-suburban "hub and spoke" development; and (3) development in outlying Bay Area counties stemming from their connection to one another, termed regional "web" development. The chapter does not present these land development patterns as alternatives; the future of development in the Bay Area will likely reflect in part each of these development patterns. Rather, the chapter structures the discussion in this way to systematically and coherently present the issues pertaining to the economic and land use outlook. Each regional development pattern presents its own set of considerations related to the formulation of regional rail plan alternatives and screening criteria. These considerations are explored at the end of each section.

Following a discussion of the spatial development patterns, **Chapter IV** provides a detailed survey of regional land use policies and programs aimed at addressing many of the growth challenges confronting the Bay Area. The chapter highlights the existing policies that should be considered in the establishment and evaluation of passenger rail improvements and expansions.

Chapter V builds from the dual foundation of the economic/land use outlook and land use policies, culminating in a recommended set of land use screening criteria for regional rail alternatives. The screening criteria are established to be consistent with economic and land use outlook realities and in harmony with the objectives of regional land use policies and programs.

Chapter VI concludes the Paper with a brief summation of key points and puts forth a few further issues that deserve attention but are beyond the Paper's immediate scope. An Appendix contains figures, tables, and maps relevant to the economic and land use outlook.

NEXT STEPS

This Paper is a key input in the production of the following two Study deliverables: (1) Technical Memorandum on Initial List of Regional Rail Network Alternatives, and (2) Technical Memorandum on Screening Criteria and Methodology for Initial List of

Alternatives. The land development framework in this Paper will also provide the foundation for more detailed analysis of each final Study alternative with regard to the potential for: (1) accommodation of population and economic growth around specific station sites and along specific corridors; (2) transit-oriented and infill development; and (3) market-driven land use shifts.

II. REGIONAL SOCIO-ECONOMIC OVERVIEW

This chapter describes the existing economic and demographic conditions and trends in the Bay Area as they relate to the formulation of regional rail plan alternatives. The analysis does not result in a unique economic or land use forecast but rather is based on a synthesis of a variety of local, regional and State data sources.

BASELINE ECONOMIC AND LAND USE GEOGRAPHY

POPULATION AND DEMOGRAPHICS

The 9-County Bay Area is home to more than 6.9 million people, two thirds of which live in the Inner Bay Area comprised of San Francisco, San Mateo, Santa Clara, and Alameda counties.[1] Expanding the 9-County Bay Area to include the outlying counties of Santa Cruz, Monterey, and San Benito to the south and the counties of San Joaquin, Stanislaus, and Merced in the Northern San Joaquin Valley, this Greater Bay Area population stands at 9.0 million.[2] These outlying counties are notable because they have contributed 34 percent of the Greater Bay Area population growth since 1990, despite comprising just 23 percent of the population currently.[3]

A demographic snapshot[4] of the region shows that counties in the Northern San Joaquin Valley and the South Bay Area are relatively young, with several counties having 25 to 30 percent of their population ranging from 0 to 14 years of age. Also notable, San Francisco has a uniquely large share (25 percent) of its population in their late 20s to early 30s **(see Figure 10 in Appendix)**. The race/ethnicity composition of the 9-County Bay Area is predominantly White, ranging between 40 and 50 percent in the Inner Bay Area and reaching as high as 70 to 80 percent in Marin and Sonoma counties in the North Bay Area. Outlying counties in the Northern San Joaquin Valley and in the South Bay Area have relatively large Hispanic populations, generally ranging between 30 and 50 percent **(see Figure 12 in Appendix)**.

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[1] The 9-County Bay Area includes the Inner Bay Area counties of San Francisco, San Mateo, Santa Clara, and Alameda counties, as well as Contra Costa County in the East Bay Area and Marin, Sonoma, Napa, and Solano counties in the North Bay Area.

[2] Sacramento County and surrounding counties are **beyond the scope** of this Greater Bay Area study area. Sacramento County is an employment hub unto itself, with unique relationships with outlying counties. Commute patterns of residents traveling to and from Sacramento County for work are included for reference in **Tables 6, 7, 8, and 9 in the Appendix.**

[3] Source of population figures: Woods & Poole Economics (W&P), *2005 State Profile California*.

[4] Source of demographic figures: State of California, Department of Finance, *Race/Ethnic Population with Age and Sex Detail, 2000–2050*. Sacramento, CA, May 2004.

JOBS

The vast majority of regional jobs are located in the Inner Bay Area. In 2004, Inner Bay Area counties held 60 percent of Greater Bay Area jobs.[5] In general terms of employment by industry, the Inner Bay Area displays concentrations in financial services, information services, professional and technical services including advanced technology design and research, and high-tech manufacturing.

The remaining counties in the 9-County Bay Area have relatively greater concentrations in industries related to population support such as construction, retail trade, health care, and government. There is also presence of niche agriculture and tourism-related industries in Napa and Sonoma counties. That said, there is a growing presence in the 9-County Bay Area of outlying employment centers represented by traditionally-Inner Bay Area industries. Since 1990, the share of regional jobs captured by these outlying counties has increased from 20 percent to 22 percent, mostly accounted for by job growth in Contra Costa and Sonoma counties.[6]

The remaining counties in the Greater Bay Area capture 18 percent of regional jobs.[7] The South Bay Area and the Northern San Joaquin Valley share concentrations in farm production and related manufacturing, agriculture-related services, and local government. Tourism is also an important industry segment in the South Bay Area, while the Northern San Joaquin Valley is increasingly becoming an important area for transportation and warehousing related to goods movement.

JOBS-HOUSING BALANCE

Despite a moderate decline over the last decade plus, the Inner Bay Area share of jobs remains much greater than its share of the working age population, which stands at 52 percent.[8] In fact, when comparing the number of jobs in the Inner Bay Area to the number of its employed residents, this imbalance has increased notably since 1990. In 1990, the Inner Bay Area had 1.1 jobs for every employed resident.[9] In 2000, the ratio stood at 1.2.[10]

The jobs-housing imbalance in 1990 in the Inner Bay Area was largely counterbalanced by bedroom communities in the remaining counties in the 9-County Bay Area. These counties showed a combined ratio of 0.8 jobs for every employed resident, resulting in a ratio very close to 1.0 for the 9-County Bay Area as a whole.[11] However, since 1990 the

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5 Source: W&P, *2005 State Profile California*.

6 Source: W&P, *2005 State Profile California*.

7 Source: W&P, *2005 State Profile California*.

8 Source: W&P, *2005 State Profile California*.

9 Source: Association of Bay Area Governments (ABAG) Projections 2002.

10 Source: Association of Bay Area Governments (ABAG) Projections 2005.

11 Source: ABAG Projections 2002.

9-County Bay Area has increasingly lost the capacity to house its own workforce. In 2000, the ratio of jobs to employed residents for the 9-County Bay Area was 1.1, reflecting 300,000 more jobs than employed residents.[12]

LAND USE

Development Density[13]

The majority of land in the Greater Bay Area is characterized as farmland, which comprises 64 percent of the regional acreage. Other non-urbanized land including mountainous terrain constitutes 24 percent of the regional acreage, while water covers 3 percent. Nine percent of the acreage is considered urbanized or built up. The amount of urbanized land in the region varies greatly by sub-region. The Inner Bay Area has 23 percent of its land built up, compared to 11 percent in the rest of the 9-County Bay Area and four percent in the remaining six Greater Bay Area counties **(see Table 1 in Appendix)**.

Within urbanized areas residential development densities vary significantly. The number of households per urbanized acre in the Inner Bay Area is approximately 3.9; excluding the highly-dense San Francisco County it is 3.4. Outlying counties display lower development densities at 2.5 households per urbanized acre for both the 9-County Bay Area and Greater Bay Area county groups **(see Table 2 in Appendix)**. Despite intra-regional differences in density, the Greater Bay Area as a whole is highly dense in comparison to the rest of the country. According to a 2001 Brookings Institution Paper, the formerly-defined San Francisco-Oakland-San Jose Metropolitan Statistical Area ranked number five overall in persons per urbanized acre.[14] Meanwhile, Modesto of Stanislaus County ranked tenth; Salinas-Seaside-Monterey ranked twelfth; and Stockton of San Joaquin County ranked thirteenth.

Housing

Despite having relatively high development densities, the 9-County Bay Area suffers from a chronic housing shortage. A primary reason for the jobs-housing imbalance discussed above is that construction of housing units in the 9-County Bay Area has not kept pace with the region's robust job growth. Between 1990 and 2000, the 9-County

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12 Source: ABAG Projections 2005.

13 Sources: *Important Farmland Acreage Summary by Region, 2002*, California Farmland Mapping and Monitoring Program, California Department of Conservation, and Woods & Poole Economics, *2005 State Profile California*.

14 Fulton, William, Rolf Pendall, Mai Nguyen, and Alicia Harrison. 2001. "Who Sprawls Most? How Growth Patterns Differ Across the U.S." The Brookings Institution, Center on Urban & Metropolitan Policy, *Survey Series*, July.

Bay Area produced nearly 500,000 new jobs but less than 200,000 housing units.[15] The housing shortage in the Bay Area owes its emergence to several factors.

A chief factor is the type of housing stock being created. Nearly two-thirds of the 9-County Bay Area's current housing stock is single-family. Another factor contributing to the housing shortage is land availability. With many cities in the Inner Bay Area largely built-up, residential development opportunities are increasingly limited to infill development, which faces a range of obstacles. A third factor contributing to the lag in housing production is local policies related to land use and development. Land use decisions throughout the 9-County Bay Area are made at the local level and, as such, are commonly restrictive and uncoordinated. Local governments commonly favor nonresidential land uses over residential uses, and many establish urban growth boundaries and low density limits on residential lands.[16]

The lack of adequate housing supply has contributed to higher housing cost burdens, disproportionate impacts on low-income renters, overcrowded housing units, and substantial increases in commute times and distances. The housing shortage has solidified the Bay Area's reputation as one of the most expensive housing markets in the country. Consequently, workers have moved further out from job centers in search of affordable housing, making transportation issues a focal point for regional development.

Land Use and Transportation

Bay Area development has become increasingly commuter-based and automobile-oriented. Yet, the Bay Area mass transportation system includes transit agencies that rank among the largest in the country.[17] This transit presence implies opportunities to locate jobs and housing near transit. The share of jobs near transit in the 9-County Bay Area is 39 percent **(see Table 3 in Appendix)**, while the share of housing near transit is 25 percent **(see Table 4 in Appendix)**.[18] Much of these jobs and housing near transit are located in the transit-rich Inner Bay Area. Still, improvements and extensions to the mass transportation system may create additional opportunities to locate jobs and housing in proximity to transit throughout the Bay Area.

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[15] Source: ABAG, *Housing Issues in the Bay Area*.

[16] According to the 2002 *Housing Crisis Report Card*, issued jointly by the Greenbelt Alliance and the Non-Profit Housing Association of Northern California (NPH), 72 percent of Bay Area governments were failing to meet their requirements under the California "fair share" housing law.

[17] Source: American Public Transportation Association, rankings by unlinked passenger trips and passenger miles.

[18] Source: MTC Transit-Oriented Development (TOD) Study, T*ransit-Oriented Development Demand Analysis*, July 2005.

ECONOMIC AND LAND USE PROJECTIONS

POPULATION

Forecasters expect the 9-County Bay Area population to grow by about 2.0 to 2.3 million for the period 2000 to 2030.[19] They further expect 1.0 to 1.5 million persons to be added in the additional 6 Greater Bay Area counties **(see Figures 1 and 2 in Appendix)**.[20] Clearly, there is some discrepancy among forecasters as to the absolute growth in population for the region through 2030. That said, these absolute growth figures mask even greater variation in the pattern of expected population growth at the sub-regional level.

This variation is striking when comparing population forecasts provided by the California Department of Finance (CA DOF) and the Association of Bay Area Governments (ABAG) for the 9-County Bay Area. The CA DOF expects population growth to be split evenly between the Inner Bay Area and the rest of the 9-County Bay Area. By contrast, ABAG's 2005 projections expect two-thirds of the population growth to occur in the Inner Bay Area **(see Figure 3 in Appendix)**. This numerical difference reflects ABAG's expectation of considerably stronger population growth in Santa Clara and San Francisco counties. CA DOF expects much of the population growth to occur in Contra Costa and Sonoma counties.

The underlying difference between the two forecasts stems from the assumptions about regional growth patterns on which the forecasts are based. The CA DOF forecast is a trends-based forecast, which captures the recent trend of relatively faster population growth in outlying counties than in the Inner Bay Area. What makes ABAG's 2005 projections different is that they are, in part, policy-driven. The "smart growth" policies on which ABAG's projections are based shift new growth toward areas near transit and existing downtowns with an increasing effect over the thirty-year forecast horizon.

Still, discrepancies in expected growth patterns are not confined to a trends-based versus policy-based issue. Forecasts of the 15-County Greater Bay Area, which is beyond ABAG's sphere of influence, also display notable variation. For example, while the CA DOF and commercial forecaster Woods & Poole Economics (W&P) have general agreement on the share of population growth in the Inner Bay Area, their forecasts differ greatly on how much growth will be captured by the Northern San Joaquin Valley. CA DOF expects nearly one-third of regional population growth to occur in these counties, but W&P expects less than one quarter. The California Department of Transportation

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19 Sources: California Department of Finance (CA DOF); ABAG Projections 2005; California Department of Transportation (Caltrans); Woods & Poole Economics (W&P), *2005 State Profile California*. Note: Caltrans forecast extended to 2030 by applying average annual forecast growth rate from 2000-2025 to 2025-2030 period.

20 Sources: CA DOF; Caltrans; W&P.

(Caltrans) forecast is in agreement with the CA DOF on the share of population growth in the Northern San Joaquin Valley but differs with both the CA DOF and W&P on patterns of growth within the 9-County Bay Area. Caltrans expects relatively more growth to be captured in the Inner Bay Area **(see Figure 4 in Appendix)**.

JOBS

Turning to the employment outlook, job growth estimates from 2000 to 2030 range widely from 800 thousand to 1.4 million for the 9-County Bay Area, supplemented by an additional 350 to 400 thousand jobs in the Greater Bay Area counties **(see Figures 5 and 6 in Appendix)**.[21] Converse to the population forecasts discussed above, much of the disagreement among forecasters is in these *absolute* growth numbers; forecasters are in general agreement on *where* the job growth will occur. ABAG projects that 69 percent of the job growth for the 9-County Bay Area will occur in the Inner Bay Area, compared to 64 percent for Caltrans and 61 percent for W&P **(see Figure 7 in Appendix)**. For the 15-County Greater Bay Area, Caltrans and W&P differ somewhat in their allocation of growth between the Northern San Joaquin Valley and the South Bay Area **(see Figure 8 in Appendix)**. But this variation seems minor in comparison to their absolute job projection difference of about 330,000 for the entire region.[22]

JOBS-HOUSING BALANCE

Together, the population and job forecasts present notable differences for the future jobs-housing balance in the region. Unsurprisingly, the trends-based population and job forecasts suggest a growing imbalance. ABAG's policy-driven forecast, by concentrating relatively more population growth in the Inner Bay Area, bucks this trend. Yet, the ABAG forecast does little more than maintain the status quo of the imbalance. In 2030 the counties in the Inner Bay Area continue to have substantially more jobs than employed residents. Furthermore, for the entire 9-County Bay Area under ABAG's forecast there will remain 1.1 jobs for every employed resident, implying a continued influx of workers into the area from outlying counties.

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21 Sources: ABAG Projections 2005; Caltrans; W&P. Note: W&P employment forecast is adjusted to wage/salary jobs by applying each county's projected trend ratio of total employment to wage/salary employment.

22 Caltrans' forecast calls for considerably lower growth rates in jobs in the 9-County Bay Area than ABAG and W&P, particularly for Santa Clara, San Mateo, Contra Costa, Marin, and Sonoma counties. Also contributing to the absolute job growth difference, Caltrans' estimate of wage/salary jobs in the year 2000 is below that of ABAG and W&P by approximately 100,000. As such, their job growth projections are from a lower base.

OVERARCHING OUTLOOK ISSUES

In addition to the hard numbers provided by forecasters, there are several over-arching issues, or themes, to keep in mind in making an informed assessment of the Bay Area outlook. Primary are the expected dramatic shifts in the demographic makeup of the regional population. Forecasters expect a significant, region-wide increase in the Hispanic share of the population. In the South Bay Area and the Northern San Joaquin Valley, Hispanics could comprise well over half of the counties' populations by 2050.[23] This shift may present potential skill-match challenges for area employers given Hispanics' lower historical education attainment levels. Meanwhile, a country-wide aging of the population will also hit the Bay Area. The looming retirement of the baby-boomer generation will present challenges to firms to fill the worker gap left behind. At the same time the aging population is expected to be a boon to the health care industry.

Another overarching theme is ongoing structural changes in the U.S. economy. The country-wide structural decline in manufacturing employment is one. This shift may produce displaced workers and skill-match issues in the Bay Area, and it may be reflected in firms leaving the Bay Area or reconfiguring their operations. Also important to the outlook will be the rate of structural productivity gains in the region, which are essential to the support of real personal income growth of Bay Area residents and to the support of the Bay Area economy overall.

While the themes discussed above are generally regarded as evident, there are other, less transparent, overarching issues that will affect the outlook. These include uncertain regional macroeconomic effects stemming from such events as the escalating cost of housing in the Bay Area, as well as uncertain national macroeconomic effects stemming from such events as escalating current account and budget deficits or Social Security insolvency. Another issue that clouds the outlook is the degree of future expansions and contractions in the U.S. business cycle. Meanwhile, the uncertain energy outlook presents issues for the cost of doing business, the cost of living, the level of global integration, and the future of transportation.

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23 Source: CA DOF.

III. LAND USE FRAMEWORK

The population and job forecasts and the overarching economic and demographic issues discussed in the previous chapter present a range of possible futures for the Bay Area. The wide variation in potential outcomes highlights the primary question that this Paper aims to address—that is, how will the Bay Area accommodate its future population and job growth? Will current trends persist? Will unforeseen events steer growth in an unexpected direction? Will "smart growth" policies alter the landscape? The answers to these types of questions have significant implications for economic development and land use patterns going forward.

To address these questions this chapter is devoted to critical analysis of possible spatial development patterns in the Greater Bay Area. To facilitate this discussion this chapter relies on an overarching framework for understanding land use growth patterns. This framework consists of three distinct, although not mutually exclusive, land use patterns. These include urban infill "core" development, urban-suburban "hub and spoke" development, and regional "web" development.

URBAN INFILL "CORE" DEVELOPMENT

Some degree of future development in the Greater Bay Area will occur on previously undeveloped greenfield sites at the urban fringe. While such development will likely be most prevalent in outlying lower-cost, lower-density counties, the Inner Bay Area will not be immune to this type of development, particularly in Santa Clara and Alameda counties. However, given that such development would put substantial pressure on limited open space lands in the Inner Bay Area, development opportunities over the long-term horizon will be increasingly tied to infill development— building homes, businesses, and public facilities on vacant or underutilized lands within existing urban areas. The transit richness of the Inner Bay Area will provide a unique opportunity to focus infill development in proximity to transit.

For the purposes of this Paper, we define urban infill "core" development as infill development within Inner Bay Area counties. The extent to which future regional development is represented by urban infill "core" development is largely contingent on the employment and land use outlooks for the Inner Bay Area. In terms of employment, a primary factor is the likelihood of continued business formation and job growth in the Inner Bay Area, which has related implications for workers' demand for housing in the Inner Bay Area. As for land use, important factors include land availability and market potential for infill development in the Inner Bay Area, as well as obstacles and support to infill development and transit-oriented development initiatives. The Paper considers each of these issues in turn, starting with the dynamics of the Inner Bay Area labor market and then turning to issues related to future Inner Bay Area land use and the potential for accommodation of regional population growth. This section closes with

implications of this development pattern for regional rail plan alternatives and screening criteria.

LABOR MARKET OUTLOOK

The Inner Bay Area is the employment hub of the region, comprising 60 percent of all Bay Area jobs. Employment industries are predominantly service-oriented, with notable concentrations in:

- **Professional, scientific, and technical services,** led by computer system design and scientific research and development
- **Information services,** led by software publishers and internet service providers
- **Financial services**

There is also a considerable presence of **high-tech and biomedical manufacturing** firms, especially in Santa Clara County. On balance, jobs in the Inner Bay Area are relatively high-paying and high-value added per employee. The Inner Bay Area is also home to a relatively large share of small businesses.

Competitive Strengths and Weaknesses[24]

The Inner Bay Area labor market has several competitive strengths that will positively affect its outlook:

- **Entrepreneurship and new business creation.** In the face of growing competition on a global scale, employment growth continues to be supported by entrepreneurial, small business creation and the Inner Bay Area's attractiveness to foreign-owned companies.
- **Research in advanced technologies.** The recently-approved Stem Cell Research Initiative is evidence of emerging research fields.
- **Cross-disciplinary research.** The Inner Bay Area is home to eleven major research universities and laboratories.[25] In addition, there is a growing convergence of nano-, bio-, and information technologies, which is believed to have huge market potential.
- **Concept and market development.** This competitive attribute is evidenced by a great number of firms pursuing concepts and markets that include wireless innovation, multi-use consumer products, and internet search technologies.

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[24] Primary source: *The Future of Bay Area Jobs: The Impact of Offshoring and Other Key Trends*, A.T. Kearney, et al.

[25] UC-Santa Cruz, located outside the Inner Bay Area in Santa Cruz County, is also considered to be an important research university.

- **Global integrated management.** The San Francisco Bay Area is one of the leading export centers in the county. In addition, large financial service firms in San Francisco and high-tech design and manufacturing firms in Silicon Valley support the Inner Bay Area's integration with dynamic global markets.

The competitive strengths of the Inner Bay Area's labor market will be mitigated by certain weaknesses, however:

- **Mass manufacturing and back-office operations.** These firms are increasingly under pressure from lower cost areas, both domestically and overseas. Santa Clara county manufacturing jobs declined from a 30.5 percent share of county employment in 1990 to 19.8 percent in 2004.[26] The loss of additional manufacturing jobs in the future is likely. Meanwhile, the Inner Bay Area will also face the challenge of growing capacity overseas to perform a range of service-oriented, back-office business functions.
- **Product enhancement in maturing industries.** The relatively high cost structure of the Inner Bay Area combined with growing capacity elsewhere to perform a range of research, manufacturing, and service functions, raises concerns about the Inner Bay Area's ability to compete in product and process enhancement. Maturing companies that tend to focus less on innovation and more on product customization may move more jobs outside the Inner Bay Area.
- **Vulnerability to the business cycle.** With large concentrations of jobs in high-technology industries that are historically volatile, the Inner Bay Area labor market is subject to significant, cyclical downturns tied to the business cycle.

Taking the Inner Bay Area labor market's competitive strengths and weaknesses together, the outlook is generally positive. Job growth will likely be driven by continued creation of new businesses in existing and emerging technology clusters, and in a wide range of service-providing industries. The Inner Bay Area will continue to be a strong place to start a business, but it may not capture the bulk of jobs as companies mature and expand.

LAND USE OUTLOOK

Having considered the labor market dynamics of the Inner Bay Area, what can be made of its ability to accommodate firm expansion and to house its workers? The land use outlook and the potential for the Inner Bay Area to accommodate regional job and population growth hinge on a variety of factors, including land availability and market potential for infill development in the Inner Bay Area, as well as obstacles and support to infill development and transit-oriented development initiatives.

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[26] Source: California Employment Development Department.

Land Availability

Although the underlying dynamics of the Inner Bay Area labor market suggest strong growth, the diminishing number of large, contiguous sites available for office or R&D development will tend to push businesses to outlying areas. Increasingly, new development opportunities in the Inner Bay Area will be limited to smaller infill sites and/or the redevelopment of underutilized, transitioning areas. Several studies have been conducted to determine the availability of land in the Bay Area for infill development. For example, a 2000 study by Juan Onesimo Sandoval and John Landis showed that the Inner Bay Area had 6,991 acres of vacant land within the urban footprint and 37,533 acres of land suitable for reuse or recycling—i.e., redevelopment of developed parcels that are physically or economically underutilized **(see Maps 1 through 4 in Appendix)**.[27] Approximately 37 percent of the recyclable acreage was shown to be zoned for nonresidential development.

Landis and Sandoval further produced estimates of the amount of housing units that could be accommodated on infill sites in the Inner Bay Area. Assuming an upper bound in which vacant or underutilized acres that are currently zoned for nonresidential development may be used for residential development, they concluded that there was potential for Inner Bay Area counties to accommodate net financially-feasible new housing units in a range of 30,423 to 76,545, depending on development densities.[28]

Market Potential

Another important factor affecting the land use outlook of the Inner Bay Area is the market potential for infill development. In terms of employment, the market dynamics discussed above are generally supportive of firm expansion. The market potential for residential infill also appears reasonably solid. The significant jobs-housing imbalance in the Inner Bay Area has created considerable pent-up demand for housing. Complementing this pent-up demand, there appears to be notable public interest in the type of housing common to infill development. In its regional smart growth planning workshops, ABAG received generally positive responses from the public regarding high-density infill projects. The projected demographics of the Inner Bay Area also lend themselves to infill development. The shift toward an aging population will create a pool of empty nesters and elderly who will prefer high-density housing. In addition, the growing prevalence of singles, young couples without children, and nontraditional families suggests growing demand for high-density urban living.

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[27] Source: Sandoval, Juan Onesimo and John D. Landis. 2000. "Estimating the Housing Infill Capacity of the Bay Area." *Institute of Urban & Regional Development Working Paper Series*, University of California, Berkeley.
[28] Low estimate reflects development at recent average densities. High estimate reflects development at 150 percent of historic densities.

Transit-Oriented Development Potential

In addition to positive market potential for infill development in general, there appears to be significant potential for infill transit-oriented development (TOD) in the Inner Bay Area. The existing transit network of the Inner Bay Area presents the opportunity to focus infill development around transit stations and along transit corridors.

The influx of regional residents into the Inner Bay Area during work hours is well documented. What may be less obvious is the tremendous amount of movement of employed residents to their jobs *within* the Inner Bay Area. According to the 2000 California Transportation Planning Package (CTPP), 96 percent of Inner Bay Area employed residents worked in the Inner Bay Area. While most worked in their county of residence, 21 percent worked in another Inner Bay Area county, constituting a tremendous inter-county worker flow of 480 thousand persons **(see Table 5 in Appendix)**. By the year 2030, MTC expects significant increases in daily person trips crossing county borders in the Inner Bay Area, reaching a total inter-county travel volume of approximately 3.0 million **(see Map 8 in Appendix)**.[29]

There will be notable demand for jobs and housing near transit in the Inner Bay Area over the next two plus decades, according to MTC's TOD Study. Potential demand for employment near transit is projected to represent nearly half of all jobs in the Inner Bay Area in 2030 **(see Table 3 in Appendix)**.[30] Potential demand for housing near transit is expected to represent a third of all households **(see Table 4 in Appendix)**.[31]

Obstacles[32]

Despite evidence of land availability and market potential, there are a variety of obstacles to infill development, particularly residential infill, in the Inner Bay Area that deserve mentioning:

- **Affordable Housing.** Housing that is created needs to be affordable to a variety of income groups.
- **General Plans and Zoning.** Standing in the way of residential infill is the amount of land zoned for commercial and industrial use.

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29 MTC Transportation 2030, *Trends*.

30 The analysis of employment demand near transit incorporates both job market forces and transit qualities, including locations of current and future employment centers, the tendency of employees in certain industries to commute on transit, and the projected growth of these industries regionally and by county.

31 The analysis of housing demand near transit considers the current tendency of various household types and age groups to locate near transit, and the distribution and growth of the projected groups within the Bay Area, according to a "TOD demographic profile."

32 Primary Source: Wheeler, Stephen M. 2001. "Infill Development in the San Francisco Bay Area: Current Obstacles and Responses."

- **Government disinterest.** Local governments commonly resist proposals of affordable infill projects, citing fiscal disincentives, city image issues, community opposition, and local desires to maintain the status quo.
- **High cost of production and land.** High-density housing construction may not be economically feasible in some areas given current market rents and development costs.
- **Financing challenges.** Limited examples of viable infill projects may restrict financing options.
- **Necessity of brownfield cleanups.** Site contamination problems may require expensive cleanups and restoration before development.
- **Parking regulations, permitting processes, and building codes.** Excessive parking requirements, arduous permitting processes, and rigid building codes increase the cost of infill development, making projects infeasible or precluding affordable housing units.
- **Systemic community problems.** Existing urban areas may be in decay with poor schools and high crime**.**
- **Neighborhood opposition (NIMBYism).** Community opposition can hamper infill projects by dragging out the infill permitting process or by initiating litigation processes.
- **Displacement.** Displacement of less-well-off populations may occur if infill development is concentrated solely in market-rate projects.

Policy Support and Advocacy

Broad Initiatives

The obstacles to infill development are formidable, but there exists a foundation of support for infill development initiatives. As early as 1990, ABAG adopted a Land Use Policy Framework that called for a city-center concept of urban development with balanced growth guided into or around existing communities. In 2000, the Bay Area's five regional planning agencies and the Bay Area Alliance for Sustainable Development (now known as the Bay Area Alliance for Sustainable Communities) combined efforts and created the Smart Growth Strategy/Regional Livability Footprint Project. The Project's smart growth policies include initiatives to improve the Bay Area's jobs-housing balance and match; to enhance community mobility, livability, and transit support; and to preserve open space **(see Maps 5 through 7 in Appendix)**. More recently, California's Business, Transportation, and Housing Secretary Sunne Write McPeak has endorsed a state-wide "anti-dumb growth" strategy with goals similar to the "smart growth" initiatives in the Bay Area.

Local Governments

Despite disinterest in infill by many local governments, several Inner Bay Area governments have taken an active role to encourage infill development in their Specific Plans. The City of Mountain View has used Specific Plans to promote TOD, downtown revitalization, and other forms of infill development. The City of San Jose has created Specific Plans designed to accommodate housing in infill locations. Furthermore, under the San Francisco Better Neighborhoods 2002 program, San Francisco worked with residents to develop Specific Plans for three areas of the city.

Advocacy Groups

Meanwhile, there are a growing number of advocacy groups in the Bay Area that promote infill development. Perhaps among the most far-reaching and well-positioned is the Bay Area Alliance for Sustainable Communities. Promoting its "e-vision" of prosperous economy, quality environment, and social equity, the Bay Area Alliance is steered by groups that include Urban Habitat, the Silicon Valley Leadership Group, ABAG, the Greenbelt Alliance, and the Bay Area Council.

Nonprofit Developers

The Bay Area is home to a large and growing community of nonprofit developers, many of whom specialize in infill development. The nonprofit organization Urban Ecology compiled a profile summary of leading infill developers in 2000. The Non-Profit Housing Association of Northern California (NHP) acts as the collective voice of those who support, build, and finance affordable housing. NHP is steered by nonprofit developers that include Mercy Housing, Eden Housing, and BRIDGE Housing, among others.

Transportation Agencies

Coincident with general interest and support for infill development, there is a growing effort to link infill development directly to transit. In late 2003, the MTC built upon its Transportation for Livable Communities (TLC) program and Housing Incentive Program (HIP) by adopting a formal Transportation/Land Use Platform. The Platform calls for a stronger linkage between transportation and land use planning in the Bay Area. It conditions the award of regional discretionary funds under MTC's control for Resolution 3434 expansion projects on the demonstration by local government that plans are in place supporting TOD. In accordance with its Platform, MTC's ongoing TOD Study involves analyzing the TOD potential immediately proximate to current and future transit stations, hubs and corridors. The TOD Study will provide information to assist MTC in defining how the policy to condition transit funding on supportive land use could be implemented.

While MTC is clearly the leader in the promotion of region-wide TOD, individual local governments, transit agencies, and advocacy groups are becoming increasingly involved. The San Mateo County Transit-Oriented Development Incentive Program uses transportation funds to spur housing development near rail stations within the

county. BART, through its Transit Extension Land Use Policies, has developed transit extension guidelines that use thresholds measuring anticipated jobs and housing near stations and help with the development of neighborhoods with good pedestrian access to transit stops and stations. The Transportation and Land Use Coalition (TALC), a partnership of over 90 groups working for a sustainable and socially just Bay Area, has put forth a set of recommended land use policies that promote a region with healthy, vibrant, walkable communities that provide all residents with transportation choices and affordable housing. In January 2000, the Coalition released the cornerstone report, *World Class Transit for the Bay Area*, which provided a comprehensive vision of a future Bay Area transit system and TOD.

IMPLICATIONS FOR REGIONAL RAIL PLAN

The spatial development pattern of urban infill "core" development presents unique considerations for regional rail plan alternatives and screening criteria. In particular, the prospect of infill development in the Inner Bay Area implies that strong consideration should be given to enhancing the existing core rail network. Such enhancements may include:

- **System capacity**
- **System maintenance**
- **Infill stations**
- **Inter-modal stations**
- **Feeder services and linkages to light-rail and bus networks**

The urban infill "core" development pattern also raises important considerations with regard to the alignment of high-speed rail into the Inner Bay Area:

- **Priority employment centers.** The entry point of high speed rail into the Inner Bay Area will implicitly prioritize East Bay versus South Bay employment centers.
- **Duplication of rail infrastructure.** High speed rail alignments in the Inner Bay Area may present varying degrees of duplication of rail infrastructure.
- **Station locations.** High speed rail station locations are particularly relevant in terms of: (1) service of key employment centers; (2) linkages to the existing core rail network; and (3) maximization of TOD potential.

Screening criteria may be oriented around key issues that include:

- **Thresholds for core rail network capacity increases**
- **Service of priority employment centers**
- **Potential of locating jobs and housing in proximity to transit**

- **Efficiency of linkages between rail/light-rail/bus jurisdictions**

The following key rail corridors outlined by Earth Tech, Inc. in **Map 12 of the Appendix** relate to the regional rail implications of the urban infill "core" development pattern:

- **Corridor 4:** San Francisco – Santa Clara (Caltrain Corridor)
- **Corridor 6:** Alameda – Santa Clara (East Bay Corridor)
- **Corridor 7:** San Francisco – Alameda; San Mateo – Alameda (Transbay Corridors)

URBAN-SUBURBAN "HUB AND SPOKE" DEVELOPMENT

Even if a nontrivial amount of urban infill "core" development occurs, future development in the Greater Bay Area will to some degree reflect continued suburban development. Suburban development is commonly characterized by growth of relatively low-density residential suburban communities around an urban employment core. For the purposes of this Paper, we define urban-suburban "hub and spoke" development as development of residential-intensive communities with a commuter culture in Bay Area counties that surround the Inner Bay Area employment hub.

The extent to which future regional development is represented by urban-suburban "hub and spoke" development is contingent on a variety of factors that include the employment outlook of the Inner Bay Area and surrounding counties and the extent to which infill development occurs within the Inner Bay Area and in the existing suburban footprint. We look at each of these issues in turn, but begin with a discussion of the historical pattern of "hub and spoke" development in the region and a definition of the primary corridors of worker flows into the Inner Bay Area. This section of the Paper concludes with implications of this development pattern for regional rail plan alternatives and screening criteria.

HISTORICAL PATTERNS[33]

The emergence of the urban-suburban "hub and spoke" development pattern in the Bay Area can be traced back to the mid-twentieth century. Prior to 1950, development was primarily concentrated in the central Bay Area. The cities of Oakland and San Francisco accounted for more than 50 percent of the total 9-County Bay Area population. During early post-war years, the Bay Area began to change rapidly, as returning Veterans took full advantage of VA home loans, spurring development on low cost land on the urban fringe. Over the next several decades, development expanded along major transportation corridors to the South and East, leading to the development of major cities within commuting range of centrally-located employment centers.

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[33] Primary source: Dowall, David E. 1982. "The Suburban Squeeze: Land-Use Policies in the San Francisco Bay Area." *Cato Journal*, Vol. 2, No. 3.

As cities in the South and East became more built up, pressure to develop in the North Bay increased in step, with towns gaining significant commuter populations. Over time, the rapid rate of land conversion in the region's rural areas began to attract considerable attention, with cities moving toward growth-management plans to limit development. While these plans limited development of existing suburbs by placing limits on housing production, the effect was to further increase regional suburban development. Limits on housing development in existing suburbs forced moderate-income home buyers into outlying areas, further creating "hub and spoke" development in the region.

PRIMARY "HUB AND SPOKE" CORRIDORS

Currently, there are several key corridors that constitute significant inter-county worker flows from outlying counties into the Inner Bay Area. These workers reside in the following counties and county-clusters:[34]

- **Sonoma and Marin counties**
- **Contra Costa County**
- **Solano County**
- **San Joaquin, Stanislaus, and Merced counties** (Northern San Joaquin Valley)
- **Santa Cruz, Monterey, and San Benito counties** (South Bay Area)

In 2000, 19 percent of employed residents in these counties worked in the Inner Bay Area. When considering only employed residents who traveled to another county for work, 64 percent of those commuting residents worked in the Inner Bay Area **(see Table 6 in Appendix)**.[35] By the year 2030, MTC expects significant increases in daily person trips crossing county borders into the Inner Bay Area, reaching a total inter-county travel volume of approximately 2.1 million **(see Map 8 in Appendix)**.[36]

LABOR MARKET OUTLOOK

As discussed in the previous section, the employment outlook for the Inner Bay Area is generally positive, suggesting that the Inner Bay Area will remain the employment hub of the region. Also determining the extent of the "hub and spoke" spatial development pattern is the degree to which job growth occurs in outlying Bay Area counties.

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34 Sacramento County and surrounding counties are **NOT** included. Relatively few employed residents in Sacramento County commute to the Inner Bay Area for work **(see Table 6 in Appendix)**. Sacramento County is an employment hub unto itself, with in-commuters along spokes from outlying counties.

35 Source: 2000 California Transportation Planning Package

36 Source: MTC Transportation 2030, *Trends*.

Established Industries

The majority of jobs in outlying counties are concentrated in industries geared toward general population support, such as construction, retail trade, health care services, and local government. To the extent that these outlying counties continue to accommodate a large share of the region's population growth, employment in these industries will surely expand.

In addition to general population support industries, several outlying counties are also home to unique industries. These include:

- **Niche agriculture and tourism** in the Sonoma and Napa counties
- **Agriculture and related manufacturing and support services** in the Northern San Joaquin Valley and South Bay Area
- **Transportation and warehousing** related to goods movement in the Northern San Joaquin Valley
- **Tourism** in the South Bay Area

While employment in tourism services and transportation and warehousing are suited for expansion, the agriculture-related industries, though very important to their respective local economies, are unlikely to be significant job generators going forward. Employment expansion in these industries is limited by farmland capacity, which faces growing pressures from urbanization. Growth in demand in these industries is likely to be met through productivity gains rather than more workers.

Expanding Employment Centers

The jobs-housing balance of the region is unlikely to be altered by employment expansion in population-support industries and the unique industries described above. That said, as discussed in the previous section, there is the potential of movement of some jobs from the Inner Bay Area to outlying counties as companies mature and expand, search for lower cost available land, or follow their workers. There was evidence of such movement in the 1990s, which witnessed employment growth in outlying counties in industries that have historically been represented in the Inner Bay Area. This evidence includes:

- **High-tech manufacturing firms** in Sonoma County
- **Biotechnology, motion picture production, and software companies** in Marin County
- **Biotechnology and financial service companies** in Solano and Contra Costa counties.

Many Bay Area suburbs have shifted from traditional bedroom communities to "edge cities," meaning that as businesses have followed the labor force and decentralized to suburban locations, these communities have become employment centers in their own right.

The Tri-Valley and cities in Eastern Contra Costa County provide clear examples of the most recent wave of edge-city development.[37] In addition to rapid population growth, these areas experienced the successful development of a number of large business parks and commercial centers such as Bishop Ranch and the Hacienda Business Park. Major companies located in this submarket, such as PeopleSoft, Pacific Bell, PG&E, Silicon Graphics, and AT&T, took advantage of available land, reduced traffic, and lower housing costs relative to more urbanized areas.

Walnut Creek, which grew as a residential suburb in the post World War II period, today is a net "importer" of workers and has developed as the financial center of the East Bay. San Ramon is following a similar path. While in 1980 the community had twice as many resident workers as jobs, San Ramon is now a net "importer" of workers, with about 1.5 jobs for every employed resident.[38]

The growth of employment centers in outlying counties will continue over the long-term outlook horizon. However, forecasters and analysts generally agree that this is unlikely to occur to an extent that shifts the employment center of gravity from the Inner Bay Area. In 2030, Caltrans and W&P agree that the Inner Bay Area will still hold approximately 60 percent of Greater Bay Area jobs.

LAND USE OUTLOOK

The land use outlook in the context of the "hub and spoke" development pattern in part depends on the level of infill development in the Inner Bay Area. Accommodation of more of the region's population growth in the Inner Bay Area would reduce demands for residential land use in outlying counties. Yet even if a nontrivial amount of infill development occurs within the Inner Bay Area, the manner in which the rest of the region accommodates the remaining population is still in question. The issue remains whether accommodation will occur within the existing suburban footprint or through an expanding suburban footprint.

Current Trends

Many suburban communities are instituting urban growth boundaries and at the same time concentrating zoning within urban limits on commercial and industrial uses. These

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[37] The Tri-Valley consists of the cities of Pleasanton, Dublin, and Livermore in outer Alameda County. In Eastern Contra Costa includes the cities of Walnut Creek, San Ramon, Pleasant Hill, and Concord provide the best examples.

[38] Source: ABAG Projections 2005.

policies are aimed to limit residential sprawl on the fringes of existing suburbs and encourage employment growth within urban limits. However, these policies can also have the effect of restricting residential development that is needed not only to house employed residents commuting to the Inner Bay and other areas, but also to house employees generated from the communities' own internal job growth. Without the

production of affordable housing within existing suburbs' boundaries, the trend of low-density residential development in greenfield areas will continue, contributing to more numerous and longer suburban spokes.

Infill Development Potential

Indeed, the degree to which future development in the Bay Area is characterized by "hub and spoke" depends in part on the level of infill development within the existing suburban footprint. As discussed in the previous chapter, land availability is a primary factor in gauging infill opportunities. Sandoval and Landis' analysis is limited to the 9-County Bay Area, but within this study area they did find notable land availability for infill development within Contra Costa, Marin, and Solano counties **(see Maps 1 through 4 in Appendix)**.[39]

The market potential for infill development in these counties may not be as great as in the Inner Bay Area, however. There exist the same general obstacles to infill development discussed in the previous section. But in contrast to the Inner Bay Area, infill development in outlying counties is challenged by relatively large amounts of lower-cost land on the urban fringe and fewer examples of successful high-density development.

Transit-Oriented Development Potential

Despite relatively greater obstacles to suburban infill development in general, estimates of future demand for TOD in these counties are positive, particularly for locating jobs near transit. Demand for jobs near transit in the outlying 9-County Bay Area is expected to increase to one third of all jobs by 2030 from less than one fifth in 2000 **(see Table 3 in Appendix)**. Demand for housing near transit is also expected to increase, but to a lesser extent—to 15 percent of all housing, up from 11 percent in 2000 **(see Table 4 in Appendix)**.[40]

Policy Support and Advocacy

Smart growth efforts among government-related agencies and advocacy groups mentioned in the previous section are far-reaching across the entire Bay Area, as are

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39 Landis and Sandoval results also showed substantial potential infill acreage in Sonoma and Napa counties. However, they discount these results by noting that the majority of vacant acreage in these counties is more accurately categorized as greenfield lands and the majority of reuse acreage is zoned for nonresidential uses.

40 Source: MTC TOD Study, *Transit-Oriented Development Demand Analysis*, July 2005.

efforts to link infill opportunities directly to transit. The MTC's TOD Study has conducted case studies of the Sonoma-Marin Rail Transit (SMART) corridor and the e-BART corridor in eastern Contra Costa County. The SMART District itself has developed TOD policies, and the Transportation Agency for Monterey County (TAMC) is committed to promoting economic development around station sites in its commuter rail plan to the Inner Bay Area.

IMPLICATIONS FOR REGIONAL RAIL PLAN

The spatial development pattern of urban-suburban "hub and spoke" development presents unique considerations for regional rail plan alternatives and screening criteria. In particular, the prospect of "hub and spoke" development implies that strong consideration should be given to connection points between outlying counties and the core rail network in the Inner Bay Area. Consideration should also be given to promoting transit-oriented infill development within the existing suburban footprint. Key rail alignment issues include:

- **Inter-modal station connection points**
    - SMART Corridor connection to San Francisco
    - Solano County connection to the East Bay via Capitol Corridor or proposed Napa/Solano rail
    - ACE connection to BART in East Bay
    - Santa Cruz/Monterey/San Benito connection to Caltrain
- **Suburban infill stations**
    - Existing BART network in Contra Costa County
- **System capacity of existing/committed commuter rail**
    - BART (including e-BART and w-BART)
    - SMART Corridor
    - Capitol Corridor
    - ACE
- **New commuter rail alignments**

The urban-suburban "hub and spoke" development pattern also raises important considerations with regard to the alignment of high-speed rail into the Inner Bay Area:

- **Potential commuter service.**
    - The entry point of high speed rail into the Inner Bay Area from the East could provide much needed commuter service for employed residents in the Northern San Joaquin Valley.

  - The entry point of high speed rail into the Inner Bay Area from the South could provide a commuter option for residents of Los Banos/Merced in Merced County traveling to Silicon Valley.

- **Duplication of rail infrastructure.** The entry point of high speed rail into the Inner Bay Area from the East or South may produce varying degrees of duplication of rail infrastructure and commuter service.

Screening criteria may be oriented around key issues that include:

- **Efficiency of linkages between outlying rail alignments and core rail network**
- **Thresholds for capacity increases for existing/committed commuter rail**
- **Potential of locating jobs and housing in proximity to transit**
- **Existing and projected commuter volume in key corridors**
- **Greenfield development required by new commuter rail alignments**
- **Growth-inducing effects of new commuter rail alignments**

The following key rail corridors outlined by Earth Tech, Inc. in **Map 12 of the Appendix** relate to the regional rail implications of the urban-suburban "hub and spoke" development pattern:

- **Corridor 1:** Sonoma/Marin – Inner Bay Area (SMART Corridor)
- **Corridor 2:** Solano – Inner Bay Area (Capitol Corridor)
- **Corridor 3:** Napa – Inner Bay Area
- **Corridor 5:** Santa Cruz/Monterey/San Benito – Inner Bay Area
- **Corridor 9:** N. San Joaquin Valley – Inner Bay Area
- **Corridor 10:** Solano/Contra Costa – Inner Bay Area

REGIONAL "WEB" DEVELOPMENT

In addition to suburban development around a central employment hub, suburban development can also be characterized according to its relation to other suburbs. As the Bay Area has grown in size and competitiveness as a region, among the key trends affecting development patterns have been linkages that have grown between sub-regional centers and among industries. Specifically, the economies of Bay Area cities are becoming increasingly interdependent and mutually supporting with economic development trends in one center having important effects in another. Not only have the economies of Silicon Valley, San Francisco, and the East Bay become increasingly interconnected to each other and outer employment centers, the outer employment centers themselves are becoming increasingly linked. For the purposes of this Paper, we define regional "web" development as development in outer Bay Area county clusters

that is closely tied to unique industry and geography as well as budding employment centers.

PRIMARY "WEB" CLUSTERS

There are four main county clusters in the outer Bay Area that display notable worker flows within them **(see Tables 7 through 10 in Appendix)**.[41] They are:

- **Sonoma, Marin, Napa, and Solano** counties in the North Bay Area
- **Contra Costa, Solano, and Marin** counties to the east and north of the Inner Bay Area
- **San Joaquin, Stanislaus, and Merced** counties in the N. San Joaquin Valley
- **Santa Cruz, Monterey, and San Benito** counties to the South Bay Area

As discussed in the previous section, counties within these clusters share common concentrations in agriculture related industries, as well as other industries including tourism in the North Bay and Santa Cruz-Monterey and transportation and warehousing in the Northern San Joaquin Valley. In addition to industry ties, rapid population growth in these county clusters has led to an increase in economic interaction within them. This population growth, with supportive infrastructure and large tracts of undeveloped land zoned for commercial and industrial uses, has allowed for the relocation of jobs as reflected in budding employment centers in these counties. At the same time, expansion in transportation corridors and induced growth in cities along them has contributed to the greater flow of workers.

The extent to which future Bay Area development is represented by regional "web" development is contingent on the employment outlook and patterns of land use within these county clusters. We look at each of these issues in turn, starting with the labor market outlook and then turning to issues related to land use. This section of the Paper concludes with implications of this development pattern for regional rail plan alternatives and screening criteria.

LABOR MARKET OUTLOOK

The future level of worker flows within these county clusters hinges on the level of labor-intensive economic interaction between counties. As stated in the previous section, agricultural related industries are important drivers to the economic growth of many of these counties. However, these industries are unlikely to be significant job generators going forward, but rather meet demand and fuel growth through productivity gains. Likewise, while we can expect job growth in construction and service-providing industries stemming from population growth, these jobs are more

[41] For reference purposes, workers commuting to and from Sacramento County for work are detailed in **Tables 7, 8, and 9 in the Appendix**.

likely to be filled by local residents serving local residents, and as such will not significantly contribute to the level of labor-intensive economic interaction between these counties.

Growth in labor-intensive interaction will depend on growth in employment centers that are represented by growth-driving industries. As discussed previously, counties in the North Bay and Contra Costa County have witnessed growing employment in high-tech and professional service industries typically associated with the Inner Bay Area. Meanwhile, the Northern San Joaquin Valley has become an increasingly attractive location for new warehousing and distribution centers for northern California and the Bay Area. For example, there are plans to significantly expand the Port of Stockton, and there exists the potential to transfer freight and warehousing demands to this area from the Port of Oakland. Separately, tourism-related industries will continue to be a growth driver in the North Bay and Santa Cruz-Monterey area.

Many factors will affect future growth in employment centers in these counties. These include demographics, transportation access, infrastructure, land availability and cost, local tax and development policies, proximity to labor and markets, relationships among firms, cultural ambiance, and other factors. For example, the Northern San Joaquin Valley has large amounts of relatively inexpensive land, but a relatively young, Hispanic population with low educational attainment. Competing factors such as these will largely determine where and how much regional "web" development will occur in the outer Bay Area.

LAND USE OUTLOOK

This Paper asserts that labor-intensive economic interaction between counties is foundational to the regional "web" development pattern. Even more basic to this development pattern is the degree to which these outlying counties accommodate the region's future population growth. Should most of the region's population growth occur in these county clusters, as current trends suggest, then regional "web" development is more likely to be a dominant spatial development pattern. If instead there is a nontrivial amount of infill development within the Inner Bay Area and existing suburban footprint, then regional "web" development is likely to be less dominant.

Farmland and Urbanization

The land use outlook in the context of the regional "web" development pattern has farmland as its focal point **(see Map 9 in Appendix)**. Agriculture is an important aspect to many of the outlying Bay Area counties. But the Northern San Joaquin Valley has by far the largest percentage of its county acreage as farmland. Counties in the north and south have far more of their county acreage as mountainous terrain. In the context of regional "web" development, farmland faces increasing pressure from both residential and nonresidential land uses. According to the California Farmland Mapping and Monitoring Program, from 1992 to 2002 urbanized acres of farmland in San Joaquin

County increased by over 14,000, or 21 percent **(see Map 10 in Appendix)**. Similar double-digit urbanization rates were recorded throughout other outlying county clusters.

The urbanization in the outlying county clusters could take many forms. It could reflect the low-density norm of most new suburban growth in the US, or it could be more in the form of coastal California, with relatively high density development that is automobile-oriented. Or, it could evolve in a "smart growth" fashion, concentrated along transportation corridors in a fairly high-density manner.

The Public Policy Institute of California sponsored a Paper specifically looking at urban development futures in the San Joaquin Valley.[42] The authors put forth four urban development scenarios for the Valley: an *Accommodating Urban Development* scenario that assumes no significant urban growth restraints; a *Prime Farmland Conservation* scenario that prohibits urbanization of prime farmland; a *High-Speed Rail* scenario that focuses urbanization within a 20-mile radius of stations; and an *Automobile-Oriented Managed Growth* scenario that sketches a future in which highway transportation improvements are made in the context of an effort to shape urban growth. Each of these scenarios presents varying futures in terms of land consumption, gross population densities, and farmland loss. The study highlights the point that there are alternative pictures that can be used to compare outcomes and stimulate discussion about how regional "web" development might occur.

Local Land Use Policy and Decision-Making

The manner in which regional "web" development occurs is further shaped by the fragmented nature of local government decision-making. Virtually all land-use planning powers are held by cities (inside their boundaries) and counties (in unincorporated areas). Although these local governments must develop comprehensive land-use planning efforts, they are not required to coordinate their efforts on a regional or sub-regional level. Each city and county is permitted to pursue its own land-use planning and permitting independently. As such, variations in land-use planning within county clusters will notably affect patterns of regional "web" development.

Despite the predominance of independent land use decision-making, there are some notable examples of joint efforts in land use planning. The State of California's 2005-2006 budget contains a provision to increase Federal authority by $5 million to provide grants to metropolitan planning organizations (MPOs) to produce regional "blueprint" planning documents. MTC and ABAG have submitted a grant to produce a regional "blueprint" for the 9-County Bay Area, and eight counties in the Central Valley have collaborated in the submission of a grant to produce a regional "blueprint" for their

[42] Teitz, Michael B., Charles Dietzel, and William Fulton. 2005. *Urban Development Futures in the San Joaquin Valley*. Public Policy Institute of California.

area. These regional "blueprints" endeavor to coordinate efforts in land use, housing, economic development, transportation, and environmental protection.

Transit-Oriented Land Use Policy and Decision-Making

In addition to such broad-brush regional planning efforts, there are also examples focused specifically on the coordination of transit planning efforts in regional county clusters. The Napa/Solano Passenger/Freight Rail Study examined possibilities of passenger rail services between the two counties to serve both commuters and tourists, as well as enhancements to freight rail service. Meanwhile, the California High Speed Rail Authority, in consultation with local governments in the Northern San Joaquin Valley, has examined issues of land consumption, population and job growth, induced economic growth, and high-speed rail station development in the Northern San Joaquin Valley.

IMPLICATIONS FOR REGIONAL RAIL PLAN

The spatial development pattern of regional "web" development presents unique considerations for regional rail plan alternatives and screening criteria. In particular, the prospect of "web" development implies that strong consideration should be given to connecting employment centers in outlying counties. Consideration should also be given to promoting TOD and farmland conservation. Key rail alignment issues include:

- **New commuter rail alignments**
- **Connection points between:**
    - New rail alignments and INNER core rail network
    - New rail alignments and existing/committed OUTER rail alignments
    - Already existing/committed rail alignments
        - Solano, Contra Costa, Marin connection
- **Locations of inter-modal stations**
- **Location of high speed rail stations in Northern San Joaquin Valley**
- **Capacity and maintenance of existing/committed commuter rail alignments that serve county clusters**
    - SMART Corridor
    - Capitol Corridor
    - ACE

The regional "web" development pattern also raises important considerations with regard to the alignment of high-speed rail into the Inner Bay Area:

- **Potential commuter service.** The entry point of high speed rail into the Inner Bay Area from the East could provide much needed commuter service for an expanding regional "web" cluster that includes the Northern San Joaquin Valley and Contra Costa County.
- **Linkages to freight movement.** The growing presence of transportation and warehousing in the Northern San Joaquin Valley may have implications for rail alignment decisions.

Screening criteria may be oriented around key issues that include:

- **Efficiency of rail network linkages between:**
  - New rail alignments and INNER core rail network
  - New rail alignments and existing/committed OUTER rail alignments
  - Already existing/committed rail alignments
- **Locating inter-modal stations in key employment centers**
- **Connection of high-priority employment centers**
- **Potential of locating jobs and housing in proximity to transit**
- **Tourism-serving rail alignments that contribute meaningfully to economic growth of the region**
- **Existing and projected commuter volume in key county clusters**
- **Greenfield development required by new commuter rail alignments**
- **Growth-inducing effects of new commuter rail alignments**

The following key rail corridors outlined by Earth Tech, Inc. in **Map 12 of the Appendix** relate to the regional rail implications of the regional "web" development pattern:

- **Corridor 1:** Sonoma – Marin (SMART Corridor)
- **Corridor 2:** Solano – Contra Costa
- **Corridor 3:** Solano – Napa – Marin (and Contra Costa)
- **Corridor 8:** San Joaquin – Stanislaus – Merced (N. San Joaquin Valley)
- **Corridor 10:** N. San Joaquin Valley – Contra Costa

IV. REGIONAL LAND USE POLICIES AND PROGRAMS

To this point, this Paper has considered the long-term economic and land use outlook for the Greater Bay Area. In so doing, the Paper has discussed potential spatial development patterns for the Greater Bay Area and the unique implications that each development pattern has for formulating regional rail alternatives and screening criteria. Chapter 4 compliments the economic and land use outlook discussion by providing a regional land use policy context from which to evaluate rail improvements and expansions.

Over the past fifteen years regional agencies, and advocacy groups with an interest in regional problem solving, have developed land use policies aimed at addressing many of the growth challenges confronting the greater Bay Area. This section provides a survey of these policies and recommended approaches, highlighting those with particular relevance to regional rail alternatives and screening criteria.

ASSOCIATION OF BAY AREA GOVERNMENT'S (ABAG) LAND USE POLICY FRAMEWORK

In 1990, ABAG developed a proposed Land Use Policy Framework for the nine-county San Francisco Bay Area. The framework was intended to establish a common vision and consistent approach to regional land use issues. As stated in the framework, it is "…intended to assist us in sustaining and improving the Bay Area's quality of life." It was shaped in-part from input provided by local governments in the region. While recognizing that there were numerous growth-related issues that could be addressed in any new approach, the leaders of this effort elected to develop a discrete set of policies aimed at addressing what they believed to be the most critical land use issues confronting the region.

This framework – as set forth below - was adopted by the Executive of the Association of Bay Area Governments on July 9, 1990. It calls for a city-centered concept of urban development, with balanced growth guided into or around existing communities in order preserve surrounding open space and agricultural land, as well as environmentally sensitive areas. The intent was to reduce public costs by encouraging a more efficient use of existing and future infrastructure. Leaders also recognized that fiscal constraints and motivations have influenced many land use decisions, and suggest actions and programs to improve revenue generation and cost sharing. Policies and actions relevant to the development and evaluation of possible rail system improvements and expansions are highlighted in **bold type**.

POLICY ONE

Direct growth where regional infrastructure capacity, such as freeway, transit, water, solid waste disposal and sewage treatment, is available or committed, and where natural resources will not be overburdened.

Objectives

- Maintain adequate performance standards and levels of service throughout the region
- Focus on maintenance and use of existing and planned infrastructure
- Discourage sprawl development
- Conserve energy, land, water, and other resources
- Preserve agricultural land, open space, and environmentally sensitive areas

Actions

- Cities and counties shall designate vacant or underused land with available infrastructure for higher intensity use in their general plans.
- Cities and counties shall conserve, rehabilitate, and/or redevelop, where appropriate, existing urban areas.
- Cities, counties and special districts shall discourage significant infrastructure extensions beyond urban growth boundaries.

POLICY TWO

Encourage development patterns and policies that discourage long distance automobile commuting and increase resident access to employment, shopping and recreation by transit or non-auto means.

Objectives

- Improve air quality
- Conserve fuel
- Reduce traffic
- Increase time spent with family

Actions

- Cities and counties shall evaluate current needs, and projected population and employment growth, and modify land use policies and categories where necessary to balance future employment and housing.
- Cities and counties shall encourage employment and housing in proximity to transit stations.
- Cities and counties shall ensure that non-transit accessible employment improves job/housing balance within the community or sub-regional area.
- All public agencies shall support telecommuting opportunities.
- Cities and counties shall encourage employment that provides jobs for existing local residents.

POLICY THREE

Establish firm growth boundaries for the urban areas of the Bay Area. Direct and permit urban development only within these growth boundaries.

Objectives

- Recognize the significant investment in parks, open space, wildlife and watershed lands
- Preserve open space and agricultural land
- Protect environmental resources
- Provide greenbelts between communities
- Encourage more efficient use of land and infrastructure
- Control sprawl while providing reasonable, predictable opportunities for development within the growth boundaries

Actions

- Cities and counties shall develop long-range plans to accommodate population and employment growth projected by the regional agency. Assuming reasonable residential and employment densities, localities shall propose an urban growth boundary for inclusion in their general plan that will accommodate this growth and provide necessary environmental protection.
- Land that is located beyond urban growth boundaries will be protected for agricultural, rural, recreational, open space and wildlife uses.
- The regional agency will be responsible for final acceptance of locally proposed urban growth boundaries.

POLICY FOUR

Encourage the provision of housing opportunities for all income levels.

Objectives

- Ensure ample and diverse labor supply
- Enable workers to live closer to jobs
- Improve social welfare
- Enable public employees such as teachers, health care providers, and safety and public works personnel to live in or close to the communities they serve

Actions

- Cities and counties shall make a strong commitment to improve the supply and affordability of housing in their local plans and programs to accommodate both local and regional needs.
- Cities and counties shall develop, and include in their growth management plans and programs strategies and actions to meet local and regional housing needs.

POLICY FIVE

Allow for the development of new communities along transit corridors where interurban transit service and capacity are available or committed when they would be consistent with regional or sub-regional goals and objectives, and not negatively impact existing communities.

Objectives

- Foster a balance in land uses and services
- Expand living options for all Bay Area residents
- Utilize transit to its fullest capacity
- Preserve open space and agricultural land
- Provide compact and efficient new communities

Actions

- Counties can designate in their general plans, and regional agencies shall assign priority to, areas appropriate for new community development.

- New communities shall provide residents with the ability to live, work and shop within their boundaries.
- All public agencies shall ensure that new communities include a full range of services, such as water, sewer, public safety, transportation, schools and recreation.

SMART GROWTH/REGIONAL LIVABILITY FOOTPRINT PRINCIPLES

In 1999, the Bay Area's five regional planning agencies – the Association of Bay Area Governments, Bay Area Air Quality Management District, Bay Conservation and Development Commission, Metropolitan Transportation Commission and the Regional Water Quality Control Board – came together to promote concepts of smart growth. At the same time, the Bay Area Alliance for Sustainable Development, a coalition of 40 organizations representing business, the environment, social equity and government, embarked on an ambitious undertaking to develop a public consensus and support for a "regional livability footprint," a preferred land use pattern aimed at directing the Bay Area toward a more sustainable future. In 2000, the regional agencies and the Alliance combined efforts and created the Smart Growth Strategy/Regional Livability Footprint Project **(see Maps 5 through 7 in Appendix)**.

Between 2000 and 2002, elected officials, business and community leaders, environmentalists, social equity advocates, planners, analysts, mapmakers, agency representatives and citizens met, planned, debated, generated ideas, drew maps, made projections and analyzed outcomes. More than 2,000 residents from throughout the region attended daylong Saturday workshops to conceptualize how future growth should occur in their individual neighborhoods and counties, and in the nine-county region as a whole. This effort led to publication of a report entitled "Shaping the Future of the Nine-County Bay Area" that was published in October, 2002.

ABAG, MTC and the Air District, as well as the Bay Conservation and Development Commission (BCDC) have now adopted an official statement of commitment to the regional development principles underlying the vision. These principles reflect values articulated by workshop participants and aim to concentrate future growth near transit in a compact "network of neighborhoods," mostly existing communities, surrounding the Bay. They are intended to provide a framework for decision-making on development patterns, housing, transportation, environment, infrastructure, governmental fiscal health and social equity that can lead toward development of vibrant neighborhoods, preservation of open space, clean air and water, and enhanced mobility choices, while enhancing the Bay Area's relationship with surrounding regions. Principles relevant to the development and evaluation of possible rail system improvements and expansions are highlighted in **bold type**.

JOBS/HOUSING BALANCE AND MATCH

Improve the jobs/housing linkages through the development of housing in proximity to jobs, and both in proximity to public transportation. Increase the supply of affordable housing and support efforts to match job income and housing affordability levels.

HOUSING AND DISPLACEMENT

Improve existing housing and develop sufficient new housing to provide for the housing needs of the Bay Area community. Support efforts to improve housing affordability and limit the displacement of existing residents and businesses.

SOCIAL JUSTICE AND EQUITY

Improve conditions in disadvantaged neighborhoods, ensure environmental justice, and increase access to jobs, housing, and public services for all residents in the region. (see Map 11 in Appendix)

ENVIRONMENTAL, NATURAL RESOURCE, OPEN SPACE AND AGRICULTURAL PRESERVATION

Protect and enhance open space, agricultural lands, other valued lands, watersheds and ecosystems throughout the region. Promote development patterns that protect and improve air quality. Protect and enhance the San Francisco Bay and Estuary.

MOBILITY, LIVABILITY AND TRANSIT SUPPORT

Enhance community livability by promoting in-fill, transit oriented and walkable communities, and compact development as appropriate. Develop multi-family housing, mixed-use development, and alternative transportation to improve opportunities for all members of the community.

LOCAL AND REGIONAL TRANSPORTATION EFFICIENCIES

Promote opportunities for transit use and alternative modes of transportation including improved rail, bus, high occupancy (HOV) systems, and ferry services as well as enhanced walking and biking. Increase connectivity between and strengthen alternative modes of transportation, including improved rail, bus, ride share and ferry services as well as walking and biking. Promote investments that adequately maintain the existing transportation system and improve the efficiency of transportation infrastructure.

INFRASTRUCTURE INVESTMENTS

Improve and maintain existing infrastructure and support future investments that promote smart growth, including water and land recycling, brownfield clean-up and re-use, multi-use and school facilities, smart building codes, retention of historic character and resources, and educational improvements.

LOCAL GOVERNMENT FISCAL HEALTH

Improve the fiscal health of local government by promoting stable and secure revenue sources, reduced service provision costs through smart growth targeted infrastructure improvement, and state and regional sponsored fiscal incentives. Support cooperative efforts among local jurisdictions to address housing and commercial development, infrastructure costs, and provision of services.

COOPERATION ON SMART GROWTH POLICIES

Encourage local governments, stakeholders and other constituents in the Bay Area to cooperate in supporting actions consistent with the adopted Smart Growth policies. Forge cooperative relationships with governments and stakeholders in surrounding regions to support actions that will lead to inter-regional Smart Growth benefits.

SMART GROWTH/REGIONAL LIVABILITY FOOTPRINT PROJECT COUNTY-BY-COUNTY VISIONS

The Smart Growth/Regional Livability Project presented a suggested vision for each of the Bay Area's nine counties. These recommended changes consist mostly of more intense development in existing areas.

ALAMEDA COUNTY

Cities such as Alameda, Oakland, Berkeley and Emeryville would accommodate a growing population by encouraging increases in housing densities. Downtown Oakland would blossom with high-density structures of offices, stores and housing. Served by greatly improved ferry and bus service, the former Alameda Naval Air Station would become a community with a mix of three- and four-story commercial and retail buildings surrounded by multi-family housing. Similar mixed-use development would occur around BART stations from Berkeley south to the new Irvington and Warm Springs BART stations. Mixed-use development would appear along major transit corridors, such as San Pablo Avenue and Mission, Hesperian and International boulevards, and a multi-modal transit center would be established in Union City. Fremont would create a downtown center with high-rise office and residential buildings, while in the eastern part of the county mixed-use development would occur near the BART and Altamont Commuter Express (ACE) stations. The Tri-Valley cities of

Dublin, Livermore and Pleasanton would preserve their surrounding areas of open land and develop compact mixed-use neighborhoods within walking distance of transit.

CONTRA COSTA COUNTY

Much of the new housing would be located in and around existing cities, with continually improving access to transportation options. Significant employment growth would occur near the Orinda, Walnut Creek, Pleasant Hill, North Concord, and Pittsburg-Baypoint BART stations. New transportation linkages between central and West County would open the door to significant in the downtowns and surrounding areas. Job growth would take place along the Interstate 80 and Interstate 680 corridors, bringing a diversity of jobs closer to Contra Costa residents.

MARIN COUNTY

As in neighboring Sonoma and Napa counties, new growth would occur primarily in already developed areas. The Northwestern Pacific rail line would continue south through the towns of Novato and San Rafael, with housing, shops and offices cropping up adjacent to the new stations. San Rafael would continue revitalizing its downtown with intensified mixed-use development, including a large urban office campus. The downtown areas of Fairfax, Larkspur and Marin City would see slight increases in their residential populations, as housing units would be built above stores and offices.

NAPA COUNTY

Growth will occur primarily in the southern part of the county, while the rest of the county maintains its traditional rural and agricultural character. American Canyon would develop retail serving suburban housing developments. More people would work at the nearby Airport Industrial Park. The city of Napa would intensify development of offices, stores and housing in its downtown core, and added a mix of uses on a low-density scale in surrounding neighborhoods. New mixed-use development would occur at the site of the former State Hospital in Napa.

SAN FRANCISCO

The development of more housing throughout the city, particularly downtown, would create a better jobs-housing balance in the city. Major transit corridors such as Geary, California and Mission would include a dense mix of offices, stores and housing. Housing and employment growth would increase along the Church Street corridor as well as in Dolores Heights and in Bayview/Hunters Point. Mixed-use centers of office, retail and housing would be created around neighborhood BART stations. Development would occur along the new Third Street light-rail line that extends from Visitation Valley and Bayview Hunters Point to Chinatown and near a Caltrain station located from Paul Avenue to Silver and Oakdale Avenues.

SAN MATEO COUNTY

Growth would be intensified along the El Camino Real corridor, parallel to the Caltrain line, fostering higher density development in cities such as East Palo Alto, Redwood City, San Carlos and San Mateo. In northern San Mateo County, the Baylands, adjacent to Highway 101 in Brisbane, would be developed into an employment center.

SANTA CLARA COUNTY

Future growth would be focused around Caltrain and new BART stations – from Palo Alto and Milpitas south to Gilroy – as well as adjacent to Valley Transportation Authority light-rail stations. Downtown San Jose would mature into a taller city, with many high-rise office and residential buildings bear the new downtown BART stations. Mountain View and Sunnyvale would have fairly high density downtown centers with a mix of housing types for a wide range of wage earners. A new Caltrain station would serve an adjacent employment center in Blossom Hill, and more jobs would be found further south in the Morgan Hill business park. To accommodate employees in the business park, Morgan Hill would create a high-density town center with a mix of residential and commercial buildings around its Caltrain station. Other cities within the county would add multi-family uses in their downtown centers, creating compact neighborhoods.

SOLANO COUNTY

In an attempt to allow more residents to work near where they live, employment centers should be strengthened in Solano County. Localities would encourage the development of three- and four-story commercial buildings along portions of the I-80 corridor and mixed-use development around Capitol Corridor rail stations. Two new Capital Corridor stations would be built, one adjacent to Travis Air Force Base, and another in Dixon. Solano County would preserve its agricultural industry and character by focusing new development within its incorporated cities. The downtowns of Vallejo (including adjacent Mare Island), Benecia, Fairfield, Suisun City, Vacaville and Dixon would become centers of employment and housing.

SONOMA COUNTY

A new rail line would extend along the old Northwestern Pacific railroad right-of-way, from Cloverdale south into Marin County. New stations would be located in Healdsburg, Windsor, Santa Rosa, Rohnert Park, Cotati and Petaluma. Along the line and particularly around the stations, mixed-use communities would be built. This growth concept would promote the preservation of the county's historic rural and agricultural character by encouraging increased housing densities in existing residential areas throughout the county.

ABAG'S POLICY-BASED VS. TRENDS-BASED PROJECTIONS

As a result of the Smart Growth Strategy/Livability Footprint Project, ABAG's Projections 2003 and Projections 2005 have explicitly departed from past practice by assuming that the region's growth would be shaped by public policy to generally follow the compact, transit-oriented pattern advocated in the vision. These policy-based projections have been used by MTC as the demographic and economic forecast for the Regional Transportation Plan and by the Air District as the growth assumptions for its Ozone strategy.

MTC'S SMART GROWTH FRAMEWORK

MTC has incorporated smart growth into the Regional Transportation Plan (RTP) through a "Transportation/Land Use Platform," has provided incentives for smart growth through its Transportation for Livable Communities (TLC) and Housing Incentive Programs (HIP), and has encouraged transit-oriented development (TOD) through its TOD policy amendment to the Commission's regional transit expansion program (Resolution Number 3434).

REGIONAL TRANSPORTATION PLAN TRANSPORTATION/LAND USE PRINCIPLES AND IMPLEMENTATION STRATEGIES

In developing it Regional Transportation Plan (RTP), MTC found strong public support for better integration of transportation and land-use planning, the development of more convenient transportation options, and a greater level of regional cooperation on issues surrounding transportation and land use. The Transportation/Land Use Platform was adopted as part of the RTP to guide the Commission's strategic investments.

The Platform principles and implementation strategies are listed below, and those relevant to the development and evaluation of possible rail system improvements and expansions are highlighted in **bold type**:

Principles

- **Focus Growth Around Transit**
- Provide Community Benefits
- **Reinvest in Existing Infrastructure**
- Create Smarter Suburbs
- Build More Affordable Housing in the Right Places
- Avoid Displacement of Goods-Related Businesses and Facilities
- Develop Stronger Partnerships

Implementation

- **Prioritize transportation investments that maintain the existing core transportation network**.
- Reserve and appropriate percentage of funding from the TLC/HIP program for land-use planning efforts around existing or future transit stations and corridors.
- **Encourage cities and counties to incorporate general plan policies that support transit-oriented development around Resolution 3434 stations.**
- Support transportation/land-use coordination beyond major transportation corridors.
- **Coordinate transportation/land-use issues with regional neighbors**.
- **Develop joint planning projects with partner agencies to implement this platform and the Smart Growth Vision.**

MTC'S TOD POLICY

In 2005, MTC adopted a TOD policy which conditions regional investment in new transit projects on supportive station-area development plans, and MTC is initiating a corridor-based planning program to assist local governments in meeting the planning requirements.

MTC's adoption of this policy is based on a recognition that the more people who live, work and study in close proximity to public transit stations and corridors, the more likely they are to use the transit systems, and more transit riders means fewer vehicles competing for valuable road space. Therefore the TOD policy provides support for a growing market demand for more vibrant, walkable, and transit accessible lifestyles by stimulating the construction of at least 42,000 new housing units along the region's major transit corridors. This policy is aimed at contributing to a forecasted 59 percent increase in ridership by the year 2030. It addresses multiple goals including, improving the cost-effectiveness of regional investments in new transit expansions, easing the Bay Area's chronic housing shortage, creating vibrant new communities and helping preserve regional open space. Finally, the policy ensures that transportation agencies, local jurisdictions, members of the public and the private sector work together to create development patterns that are more supportive of transit.

BART, AC TRANSIT, AND VTA TOD LAND USE PLANNING EFFORTS

Several transit districts in the Bay Area, including the Bay Area Rapid Transit District (BART), and AC Transit, have developed guidelines for evaluating investment in new routes or extensions. BART's guidelines for extensions use thresholds measuring anticipated jobs and housing near stations to determine whether ridership will justify

the expense of creating and operating the new service. BART, AC Transit and Santa Clara Valley Transportation Authority have design guidelines to help with the development of neighborhoods with good pedestrian access to transit stops and stations.

ABAG has embarked on a program to encourage more compact, mixed-use development along three multi-modal corridors: San Pablo Avenue, East 14th/International Boulevard, and El Camino Real. ABAG and MTC have created (and the Air District has joined) the Joint Policy Committee (JPC) as a vehicle for continued collaboration on TOD and smart growth initiatives.

BAY AREA REGIONAL BLUEPRINT PROGRAM

Last year MTC and ABAG applied for a state grant to produce a regional "blueprint." The focus of this effort will be to engage in intensive consensus building with local governments to facilitate "on the ground" implementation of a shared regional growth strategy. In December 2005, the State announced that they awarded $500,000 in planning monies for the remaining six months of fiscal year 2005-2006. Pending successful completion of the first six months and the submittal of a follow-up application, another $500,000 has been set aside for fiscal year 2006-2007. The Blueprint program, extending into 2007, has two principal program components:

- **Engage local governments and community stakeholders**

  Outreach will be performed:

  - To remind local governments and local community stakeholders of the Bay Area's smart growth vision and the reasons underlying that vision
  - To clarify how the vision applies to the region as a whole and to its specific constituent communities
  - To illustrate the implications of vision-driven housing development on local neighborhood character, including transportation and environmental impacts

  The outreach will employ geographic information system (GIS) map layers to graphically demonstrate the spatial interplay of smart growth ideas and principles and will use three-dimensional imaging technology to show how density scenarios will appear in familiar contexts. Prototypical impacts on local transportation infrastructure and other common environmental concerns will also be modeled.

- **Negotiate specific priority areas for region-serving housing development**

  Priority areas will be negotiated with local governments, community groups and other stakeholders with the understanding that the priority areas will:

- Demonstrate and document local commitment to the regional vision
- Assist in the assignment of housing targets developed under a vision-driven approach to meeting regional housing needs
- Provide the geographic basis for determining eligibility for future smart growth incentives (e.g., local planning grants, transportation and infrastructure funds, open space acquisition dollars, brownfield remediation assistance, housing subsidies) to be distributed by the state or region

The focus will be on achieving a transit- and pedestrian-oriented pattern of housing development, aimed at providing significant transit and community benefits. The principal deliverable will be a set of regionally adopted priority areas, where housing and other infill planning and production can be concentrated. The development of a complementary set of resource conservation areas, from which development may be redirected, will also be initiated.

SAN JOAQUIN REGIONAL BLUEPRINT PROGRAM

Eight counties in the San Joaquin Valley, including San Joaquin and Stanislaus counties, received a state grant to develop a "blueprint" for their area. This effort will include developing and evaluating alternative land use scenarios that could be of value in the preparation of rail options between the Central Valley and the nine-county San Francisco Bay Area.

V. RECOMMENDATIONS FOR SCREENING CRITERIA

Chapter V builds from the dual foundation of the economic/land use outlook and land use policies, providing a recommended set of land use screening criteria for regional rail alternatives. The screening criteria are established so as to be consistent with both economic/land use outlook realities and policy initiatives. This chapter summarizes guidelines and standards for evaluating rail improvements and expansions. Screening of rail projects based on land use would be done at three stages: (1) in the development of regional rail plan; (2) during a project's preliminary design; and (3) during a project's final design.

CRITERIA TO BE USED DURING THE REGIONAL RAIL PLAN DEVELOPMENT PROCESS

Based on land use and economic forecast information, and current land use policies and programs, screening criteria are recommended to be used in evaluating alternative transportation system improvements in the regional rail planning process. Those proposed projects with a medium or high rating across all criteria will be given priority. In addition to the evaluation and screening criteria described below, it is assumed that issues of technical and financial feasibility will be incorporated at all levels of the alternative formulation process.

CONSISTENCY WITH REGIONAL LAND USE POLICIES
(to be ranked high, medium, or low)

1. Promotes development patterns that discourage long-distance automobile commuting, and increases resident access to employment, shopping and recreation.

2. Promotes development in already urbanized areas that will improve job-housing imbalances.

3. Supports service to, and expansion of, transit-oriented infill development (housing, employment and retail development in already urbanized areas that are within one-half mile of planned station areas).

4. Improves and maintains existing infrastructure, and promotes smart growth.

5. Maintains or enhances the existing core transportation network.

CONSISTENCY WITH CRITICAL LAND USE GOALS AND OBJECTIVES (to be ranked high, medium, or low)

Jobs-Housing Balance Criteria

6. Promotes housing opportunities in already urbanized areas that will improve job-housing balance.

7. Promotes employment opportunities in lower-cost suburban areas that will improve job-housing balance.

Economic Growth Criteria

8. Improves access between desired future major employment centers and labor force locations.

9. Improves access between budding employment centers in outlying areas.

10. Promotes growth in major regional economic industry sectors, e.g. high-technology sectors, tourism, transportation and warehousing.

11. Promotes access to and from major tourist-serving areas.

Transportation-Specific Criteria

12. Relieves existing and forecasted congestion on major highway corridors and prioritizes corridors with greatest current and projected commuter volume.

13. Prioritizes station sites and corridors with greatest TOD potential.

14. Promotes maximum capacity utilization of existing and already-committed passenger rail system.

15. Promotes efficient linkages: within the existing/committed core rail network; between outlying rail alignments and core rail network; and among outlying rail alignments.

Land Conservation Criteria

16. Minimizes greenfield development required by new rail alignments.

17. Minimizes growth inducing impacts on natural resources, open space, farm and ranch land.

Community Welfare Criteria

18. Improves access between low-income communities and major employment centers.

Policy-Specific Criteria

19. Links areas identified in the Smart Growth/Regional Livability Footprint Project.

20. Provides service to jurisdictions with adopted policies designed to focus growth toward already developed lands.

It is important to note that in using the above factors to evaluate alternative rail systems, some assumptions will need to be established about the desired location and intensity of different land uses, at a regional scale. If, during the development of this plan it becomes clear that these land uses and intensities are not politically feasible within the timeframe of this planning effort, the rail network will need to be reassessed and redesigned.

CRITERIA TO BE USED DURING THE PRELIMINARY AND/OR FINAL DESIGN PHASE OF RAIL PROJECTS

The Federal Transit Administration (FTA) has established certain guidelines and standards relating to transit-supportive land use that must be followed when new rail starts are submitted for funding. In its evaluation of the land use affecting new starts projects, FTA explicitly considers the following transit supportive land use categories and factors:

- **Existing Land Use**
- **Transit Supportive Plans and Policies**, including the following factors:
    - Growth management;
    - Transit supportive corridor policies;
    - Supportive zoning regulations near transit stations; and
    - Tools to implement land use policies.
- **Performance and Impacts of Policies**, including the following factors:
    - Performance of land use policies; and
    - Potential impact of transit project on regional land use.

Based on information submitted to FTA by local agencies, FTA gauges each category in relation to the factors identified above. FTA assigns one of five numerative ratings ("1" to "5") to each project for each of these factors. The following describes how FTA would evaluate the above categories and factors in more detail:

EXISTING LAND USE
(Evaluation factors in **both preliminary engineering and final design phase**)

- **High (5).** Current levels of population, employment, and other trip generators in station areas are sufficient to support a major transit investment. Most station areas are pedestrian-friendly and fully accessible.
- **Medium (3).** Current levels of population, employment, and other trip generators in station areas marginally support a major transit investment. Some station areas are pedestrian-friendly and accessible. Significant growth must be realized.
- **Low (1).** Current levels of population, employment, and other trip generators in station areas are inadequate to support a major transit investment. Station areas are not pedestrian-friendly.

Ratings are based on assessing the following:

- Existing corridor and station area development
- Existing corridor and station area development character
- Existing station area pedestrian facilities, including access for persons with disabilities
- Existing corridor and station area parking supply

GROWTH MANAGEMENT
(Evaluation factors in **both preliminary engineering and final design phase**)

- **High (5).** Adopted and enforceable growth management and land conservation policies are in place throughout the region. Existing and planned densities and market trends in the region and corridor are strongly compatible with transit.
- **Medium (3).** Significant progress has been made toward implementing growth management and land conservation policies. Strong policies may be adopted in some jurisdictions but not others, or only moderately enforceable policies (e.g., incentive-based) may be adopted region-wide. Existing and/or planned densities and market trends are moderately compatible with transit.
- **Low (1).** Limited consideration has been given to implementing growth management and land conservation policies; adopted policies may be weak and apply to only a limited area. Existing and/or planned densities and market trends are minimally or not supportive of transit.

Ratings are based on assessing the following:

- Concentration of development around established activity centers and regional transit; and

- Land conservation and management.

TRANSIT-SUPPORTIVE CORRIDOR POLICIES
(Evaluation factors in the **preliminary design phase**)

- **High (5).** Conceptual plans for the corridor and station areas have been developed. Discussions have been undertaken with local jurisdictions about revising comprehensive plans. Land use patterns proposed in conceptual plans for station areas (or in existing comprehensive plans and institutional master plans throughout the corridor) are strongly supportive of a major transit investment.
- **Medium (3).** Conceptual plans for the corridor and station areas are being developed. Discussions have been undertaken with local jurisdictions about revising comprehensive plans. Land use patterns proposed in conceptual plans for station areas (or existing in local comprehensive plans and institutional master plans) are at least moderately supportive of a major transit investment.
- **Low (1).** Limited progress, to date, has been made toward developing station area conceptual plans or working with local jurisdictions to revise comprehensive plans. Existing station area land uses identified in local comprehensive plans are marginally or not transit-supportive.

TRANSIT-SUPPORTIVE CORRIDOR POLICIES
(Evaluation factors in the **final design phase**)

- **High (5).** Conceptual plans for the corridor and station areas have been developed. Local jurisdictions have adopted or drafted revisions to comprehensive and/or small area plans in most or all station areas. Land use patterns proposed in conceptual plans and local and institutional plan revisions are strongly supportive of a major transit investment.
- **Medium (3).** Conceptual plans for the corridor and station areas have been developed. Local jurisdictions have initiated the process of revising comprehensive and/or small area plans. Land use patterns proposed in conceptual plans and local and institutional plan revisions are at least moderately supportive of a major transit investment.
- **Low (1).** Limited progress, to date, has been made toward developing station area conceptual plans or revising local comprehensive or small area plans. Existing station area land uses identified in local comprehensive plans are marginally or not transit-supportive.

Ratings in both of the stages listed above are based on assessing the following:

- Plans and policies to increase corridor and station area development

- Plans and policies to enhance transit-friendly character of corridor and station area development
- Plans to improve pedestrian facilities, including facilities for persons with disabilities
- Parking policies

SUPPORTIVE ZONING REGULATIONS NEAR TRANSIT STATIONS
(Evaluation factors in the **preliminary design phase**)

- **High (5).** A conceptual planning process is underway to recommend zoning changes for station areas. Conceptual plans and policies for station areas are recommending transit-supportive densities and design characteristics. Local jurisdictions have committed to examining and changing zoning regulations where necessary. Alternatively, a "high" rating can be assigned if existing zoning in most or all transit station areas are already strongly transit supportive.
- **Medium (3).** A conceptual planning process is underway to recommend zoning changes for station areas. Local jurisdictions are in the process of committing to examining and changing zoning regulations where necessary. Alternatively, a "medium" rating can be assigned if existing zoning in most or all transit station areas is already moderately transit-supportive.
- **Low (1).** Limited consideration has been given to preparing station area plans and related zoning. Existing station area zoning is marginally or not transit-supportive.

SUPPORTIVE ZONING REGULATIONS NEAR TRANSIT STATIONS
(Evaluation factors in the **final design phase**)

- **High (5).** Local jurisdictions have adopted zoning changes that strongly support a major transit investment in most or all transit station areas.
- **Medium (3).** Local jurisdictions are in the process of adopting zoning changes that moderately or strongly support a major transit investment in most or all transit station areas. Alternatively: strongly transit supportive zoning has been adopted in some station areas but not in others.
- **Low (1).** No more than initial efforts have begun to prepare station area plans and related zoning. Existing station area zoning is marginally or not transit-supportive.

Ratings in both of the stages above are based on assessing the following:

- Zoning ordinances that support increased development density in transit station areas

- Zoning ordinances that enhance transit-oriented character of station area development and pedestrian access
- Zoning allowances for reduced parking and traffic mitigation

TOOLS TO IMPLEMENT LAND USE POLICIES
(Evaluation factors in the **preliminary design phase**)

- **High (5).** Transit agencies and/or regional agencies are working proactively with local jurisdictions, developers, and the public to promote transit supportive land use planning and station area development. Local agencies are making recommendations for effective regulatory and financial incentives to promote transit-oriented development. Capital improvement programs are being developed that support station area land use plans and leverage the Federal investment in the proposed major transit corridor.
- **Medium (3).** Transit agencies and/or regional agencies have conducted some outreach to promote transit-supportive land use planning and station area development. Agencies are investigating regulatory and financial incentives to promote transit-oriented development. Capital improvements are being identified that support station area land use plans and leverage the Federal investment in the proposed major transit corridor.
- **Low (1).** Limited effort has been made to reach out to jurisdictions, developers, or the public to promote transit-supportive land use planning; to identify regulatory and financial incentives to promote development; or to identify capital improvements.

TOOLS TO IMPLEMENT LAND USE POLICIES
(Evaluation factors in the **final design phase**)

- **High (5).** Transit agencies and/or regional agencies are working proactively with local jurisdictions, developers, and the public to promote transit supportive land use planning and station area development. The transit agency has established a joint development program and identified development opportunities. Agencies have adopted effective regulatory and financial incentives to promote transit oriented development. Public and private capital improvements are being programmed in the corridor and station areas which implement the local land use policies and which leverage the Federal investment in the proposed corridor.
- **Medium (3).** Transit agencies and/or regional agencies have conducted some outreach to promote transit-supportive land use planning and station area development. Regulatory and financial incentives to promote transit-oriented development are being developed, or have been adopted but are only moderately effective. Capital improvements are being identified that support station area land use plans and leverage the Federal investment in the proposed major transit corridor.

- **Low (1).** Limited effort has been made to reach out to jurisdictions, developers, or the public to promote transit-supportive land use planning; to identify regulatory and financial incentives to promote development; or to identify capital improvements.

Ratings in both of the stages above are based on assessment of the following:

- Outreach to government agencies and the community in support of land use planning
- Regulatory and financial incentives to promote transit-supportive development
- Efforts to engage the development community in station area planning and transit-supportive development

PERFORMANCE OF LAND USE POLICIES
(Evaluation factors in the **preliminary design phase**)

- **High (5).** Transit-supportive housing and employment development is occurring in the corridor. Significant amounts of transit-supportive development have occurred in other, existing transit corridors and station areas in the region.
- **Medium (3).** Station locations have not been established with finality, and therefore, development would not be expected. Moderate amounts of transit-supportive housing and employment development have occurred in other, existing transit corridors and station areas in the region.
- **Low (1).** Other existing transit corridors and station areas in the region lack significant examples of transit-supportive housing and employment development.

PERFORMANCE OF LAND USE POLICIES
(Evaluation factors in the **final design phase**)

- **High (5).** A significant number of development proposals are being received for transit-supportive housing and employment in station areas. Significant amounts of transit-supportive development have occurred in other, existing transit corridors and station areas in the region.
- **Medium (3).** Some development proposals are being received for transit supportive housing and employment in station areas. Moderate amounts of transit-supportive development have occurred in other existing transit corridors and station areas in the region.
- **Low (1).** A limited number of proposals for transit-supportive housing and employment development in the corridor are being received. Other existing transit corridors and station areas in the region lack significant examples of transit supportive housing and employment development.

Ratings in both of the stages above are based on assessment of the following:

- Demonstrated cases of development affected by transit-oriented policies
- Station area development proposals and status

POTENTIAL IMPACT OF TRANSIT PROJECT ON REGIONAL LAND USE
(Evaluation factors in **both the preliminary engineering and final design phase**)

- **High (5).** A significant amount of land in station areas is available for new development or redevelopment at transit-supportive densities. Local plans, policies, and development programs, as well as real estate market conditions, strongly support such development.
- **Medium (3).** A moderate amount of land in station areas is available for new development or redevelopment at transit-supportive densities. Local plans, policies, and development programs, as well as real estate market conditions, moderately support such development.
- **Low (1).** Only a modest amount of land in station areas is available for new development or redevelopment. Local plans, policies, and development programs, as well as real estate market conditions, provide marginal support for new development in station areas.

Ratings based on assessment of the following:

- Adaptability of station area land for development
- Corridor economic environment.

In summary, well after the regional rail plan is established, the plans for individual rail segments will be submitted to the FTA for funding. In its evaluation, the FTA will assess the land use implications of each proposed rail corridor at two stages in the engineering design process. For example, the planning and policy oriented factors (existing land use, containment of sprawl, and corridor policies) are relevant in evaluating projects in all stages of project development, but particularly useful for projects early in project development. On the other hand, the implementation oriented factors (supportive zoning regulations, implementation tools, and performance of land use policies) are more applicable in evaluating projects more advanced in preliminary engineering or final design. Consistency of various proposed rail system alternatives with the above FTA factors should be taken into consideration in developing the overall rail plan.

VI. CONCLUSION AND FURTHER ISSUES

CONCLUSION

The location, direction, and pattern of future development in the Greater Bay Area could take many forms. It may occur in already developed cities and urbanized areas, or at the periphery of the region. This Paper addresses three potential forms of spatial development: (1) development in the urban center of the Bay Area, termed urban infill "core" development; (2) development in outlying Bay Area counties stemming from their connection to the urban center, termed urban-suburban "hub and spoke" development; and (3) development in outlying Bay Area counties stemming from their connection to one another, termed regional "web" development.

The outlook discussion does not present these land development patterns as alternatives. The future of development in the Bay Area will likely reflect in part each of these development patterns. However, this Paper also surveys regional land use policies and programs that are normative in nature. These policies concern themselves with where new development *should* occur. Together, the economic/land use outlook and regional land use policies present important considerations related to the formulation of regional rail plan alternatives and screening criteria.

REGIONAL ECONOMIC AND LAND USE OUTLOOK

It appears evident that the Inner Bay Area will continue to be the employment core of the region, and as such, we can expect a degree of infill development among businesses in the Inner Bay Area and the continuation of commuters into the Inner Bay Area along spokes from outlying counties. That said, growing employment centers in outlying counties may moderate "hub and spoke" development and contribute to a pattern of regional "web" development in the Bay Area.

The central theme of the land use outlook is the manner in which the Bay Area will accommodate its future population growth. There are opportunities and policy-driven support for infill residential development in the Inner Bay Area, but formidable obstacles remain. Opportunities for infill development also exist within the suburban footprint of the region, although the market potential in these areas may be more limited. Should the majority of the region's population growth be captured in outlying counties, as current trends suggest, then "hub and spoke" and "web" development patterns are likely to dominate the landscape.

REGIONAL LAND USE POLICIES AND PROGRAMS

A theme of many regional land use policies and programs is to promote infill and transit-oriented development within the existing urban/suburban footprint. Regional

land use policies aim to expand the choices of living environments and transportation modes available to residents and workers. These efforts are based on the premise that enlarging the availability of transit service linking concentrations of development will reduce the amount of land needed for new development and the amount of travel by automobile, thus decreasing adverse economic, environmental, and social effects of low-density regional growth patterns. It is also assumed that curbing low-density sprawl could help in revitalizing and stabilizing older urban areas and provide the variety of lifestyles suitable for an increasingly diverse population.

RECOMMENDATIONS FOR SCREENING CRITERIA

Screening criteria for new rail corridors should be consistent with economic and land use outlook realities, and at the same time, be in harmony with the objectives of regional land use policies and programs. Specifically, screening criteria should measure proposed rail alternatives for consistency with economic growth forecasts, including the distribution of such growth throughout the region. These criteria should further evaluate rail alternatives for harmony with adopted regional land use and transportation policies and programs as well as with factors aimed at directing economic growth patterns in a particular direction, protecting environmental quality, and eliminating social inequities.

ISSUES FOR FURTHER CONSIDERATION

There are several issues beyond the immediate scope of this Paper that deserve attention. First is the general idea of how transportation infrastructure and improvements themselves might affect the composition and patterns of growth and land use going forward. Second is the relationship between transit modes or technology and regional land use patterns. Third is the issue of phasing in the regional rail plan, noting that development patterns in the Greater Bay Area are likely to occur at varying rates and times over the long-term horizon. All of these issues may present important considerations in the formulation of regional rail plan alternatives and screening criteria.

EFFECT OF TRANSPORTATION INFRASTRUCTURE ON REGIONAL DEVELOPMENT PATTERNS

First, improvements to transportation infrastructure may produce nontrivial effects on regional development patterns. The analysis in this Paper has presented a broad spectrum of issues related to future spatial development patterns, all of which have unique implications for regional rail plan alternatives and screening criteria. However, this Paper does not explicitly consider how these spatial development patterns might be affected by the rail alternatives themselves. Similarly, independent long-term forecasts of Bay Area population and employment growth do not explicitly consider a regional rail plan in their assumptions. ABAG does assume general transportation-related

improvements and general policies of transit-oriented development, but it does not assume specific rail alignments.

The location of new rail alignments or enhancements to the existing/committed Bay Area rail network may have implications for future regional growth patterns. For example, concentrating regional rail efforts on maintenance and capacity in the Inner Bay Area, including infill station development and transit-oriented development around existing stations, may result in a greater degree of infill "core" development actually occurring. Similarly, focusing efforts on building inter-county alignments in outlying areas may result in a greater degree of regional "web" development. Furthermore, focusing efforts on inter-modal station development may have consequences for "hub and spoke" development. Having an understanding of these types of effects potentially enables transportation planners and policymakers to steer regional growth patterns in a desired direction.

Induced Economic Growth

Transportation infrastructure may also affect regional growth patterns through induced growth. Transportation investments can lead to reduced travel time or cost, improved accessibility to regions or parts of regions, or reduced accidents or air pollution. These effects contribute to economic growth by allowing time and money previously spent on travel to be used for other purposes, attracting businesses and residents to places with increased accessibility or improved quality of life, and reducing overall costs to society. The population and employment growth that result comprise the growth-inducing effects of transportation investments.

However, this growth can contribute to additional impacts, sometimes negative, beyond those directly attributable to the changes in the transportation system. These include demands on existing transportation infrastructure, air quality, land use compatibility, and farmland and wetland consumption, among others. Notably, the California High Speed Rail Authority's final EIR provides analysis as to the potential of induced growth effects and indirect impacts of high-speed rail alternatives.

EFFECT OF TRANSPORTATION MODES/TECHNOLGY ON REGIONAL DEVELOPMENT PATTERNS

A second important issue beyond the scope of this Paper that deserves attention is the relationship between transit modes or technology and land use. For example, a new rail alignment, which may involve significant acquisitions of land and right-of-way issues, versus a Bus Rapid Transit line, which makes use of existing transportation infrastructure, could have significantly different impacts on land use patterns. New rail alignments may require significant greenfield development, produce relatively more undesirable growth-inducing effects, and have relative difficulty gaining close proximity to housing. The Transportation and Land Use Coalition (TALC) cornerstone report *World Class Transit for the Bay Area* has an "express bus web" as its centerpiece as

opposed to rail technology. Current examples of bus rapid transit in the Bay Area include AC Transit's Transbay buses and Golden Gate Transit's buses linking Marin and San Francisco counties.

REGIONAL RAIL PHASING

Development patterns in the Greater Bay Area are likely to occur at varying rates and times over the long-term horizon. As a hypothetical example, infill development in the Inner Bay Area may be prevalent over the next twenty years, whereas significant growth in outlying employment centers, in the Napa and Solano counties for example, may not occur for thirty or more years. Such variation in rates of spatial development may have important implications for the prioritizing and phasing of regional rail plan initiatives. Higher priority may be given to increasing the capacity of the core rail network in the Inner Bay Area, and lower priority given to a new commuter rail alignment between Napa and Solano counties. Also, given that focused transportation infrastructure improvements can affect regional development patterns, phasing of the regional rail plan initiatives may also be coordinated so as to steer development patterns in a desired direction.

VII. APPENDIX

Supporting figures, tables, and maps can be found on the following pages, as listed in the List of Figures, Tables, and Maps following the Table of Contents.

Figure 1

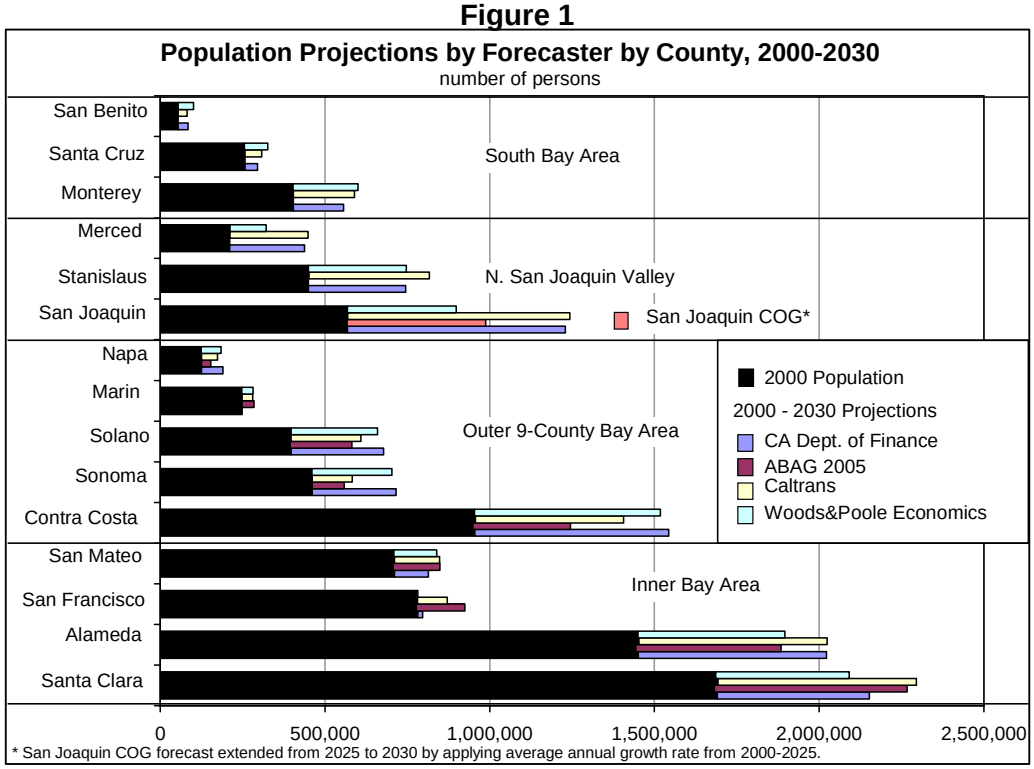


Figure 2

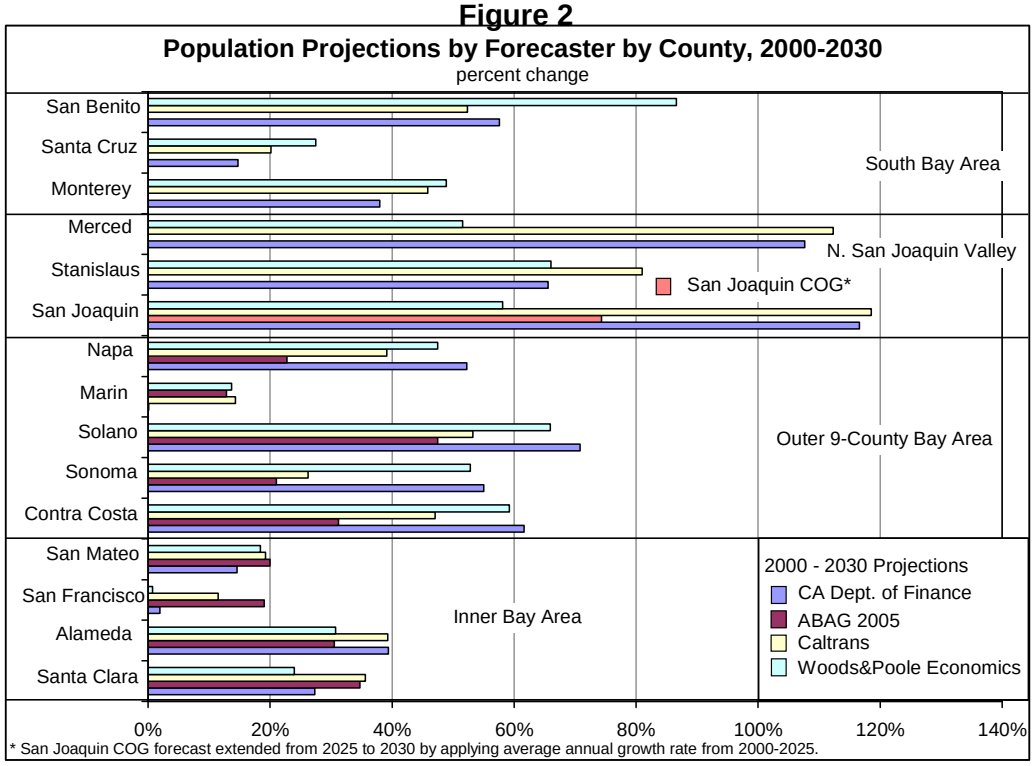


Figure 3

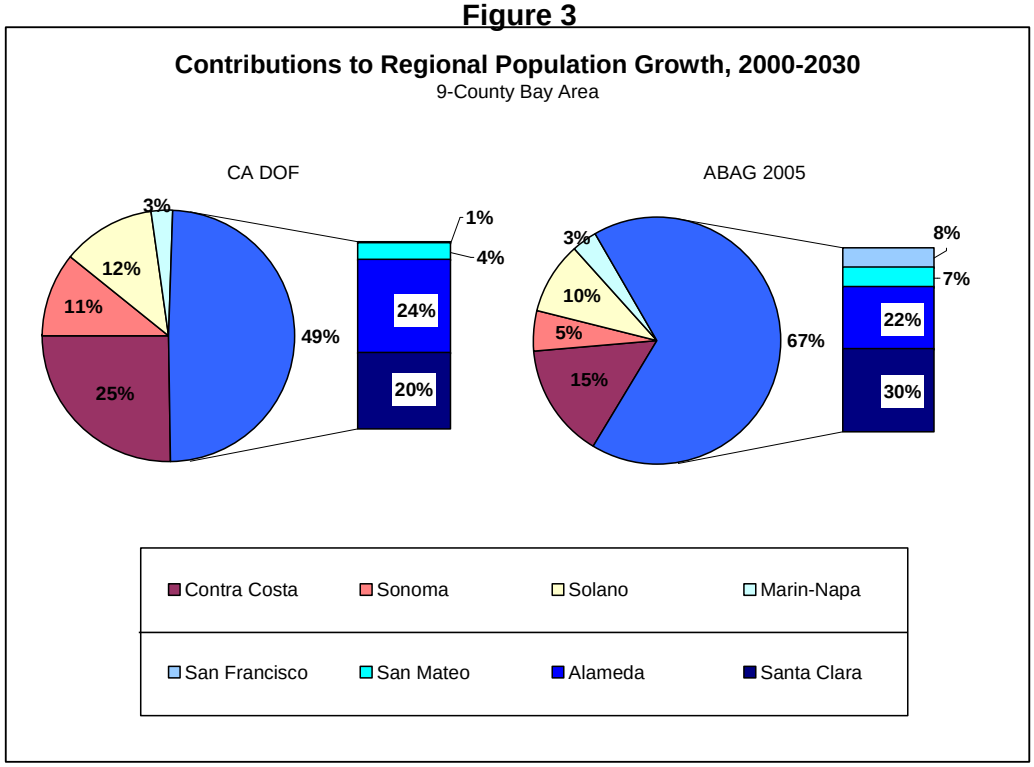


Figure 4

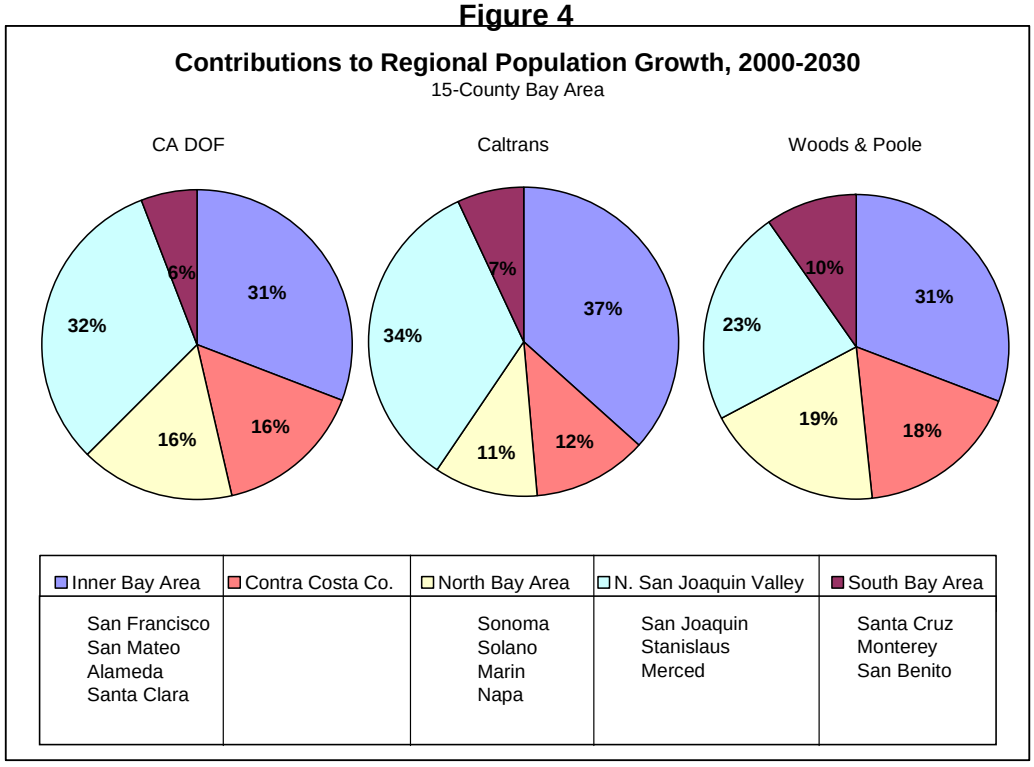


Figure 5

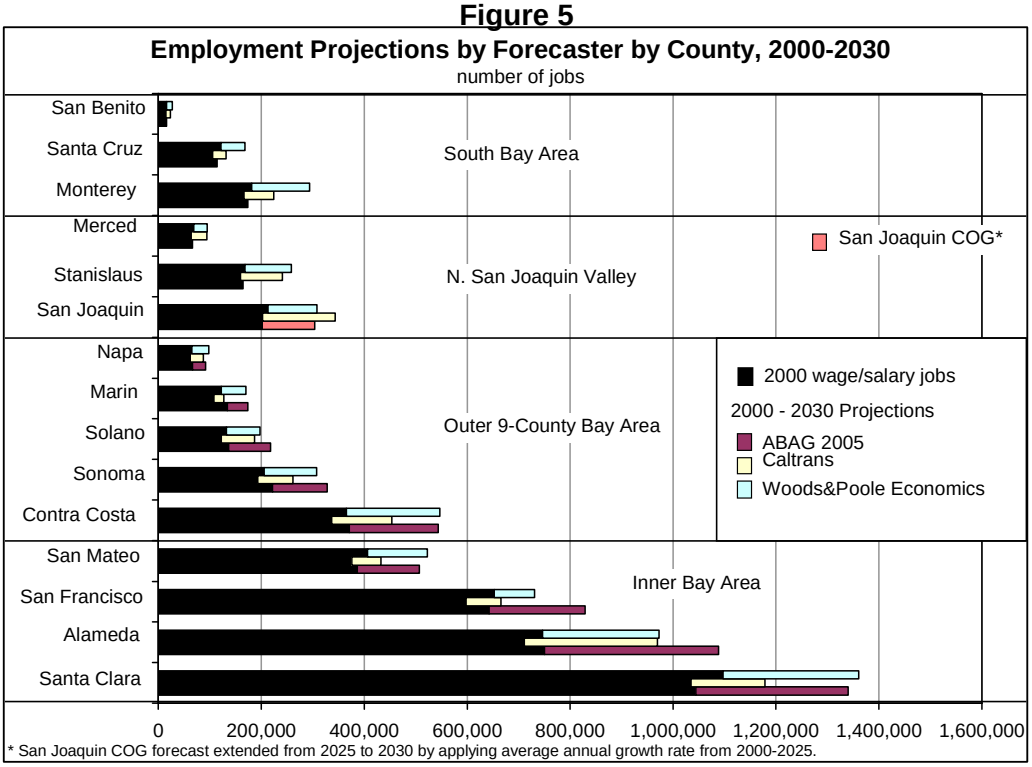
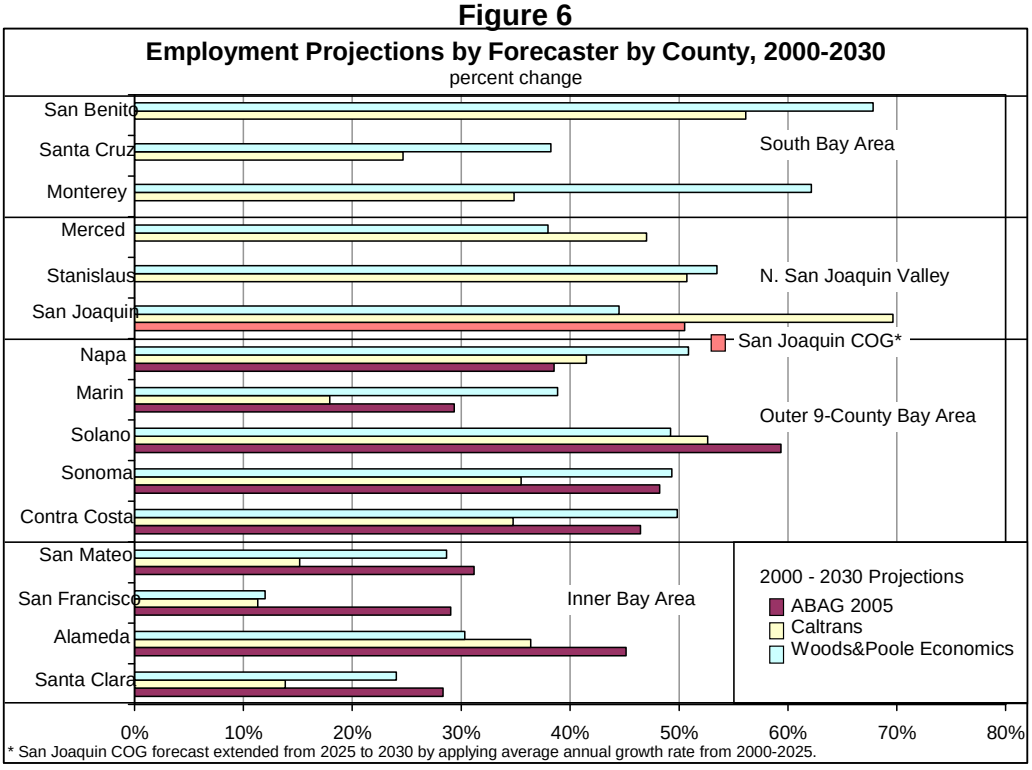


Figure 6



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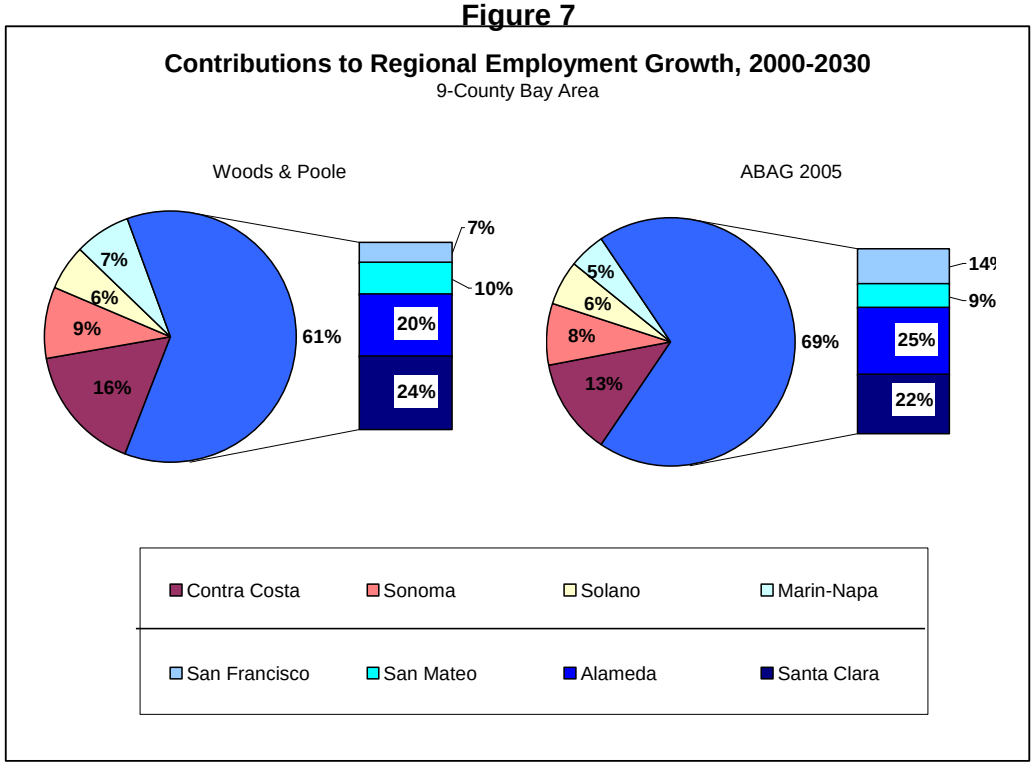

Figure 8

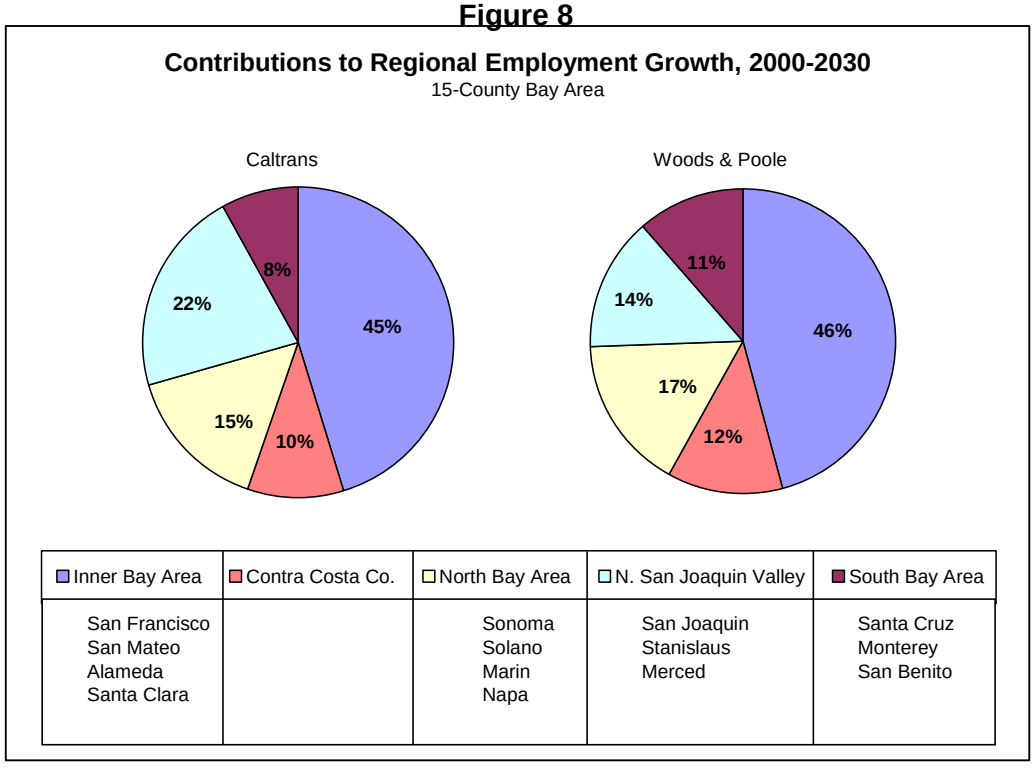

Figure 9

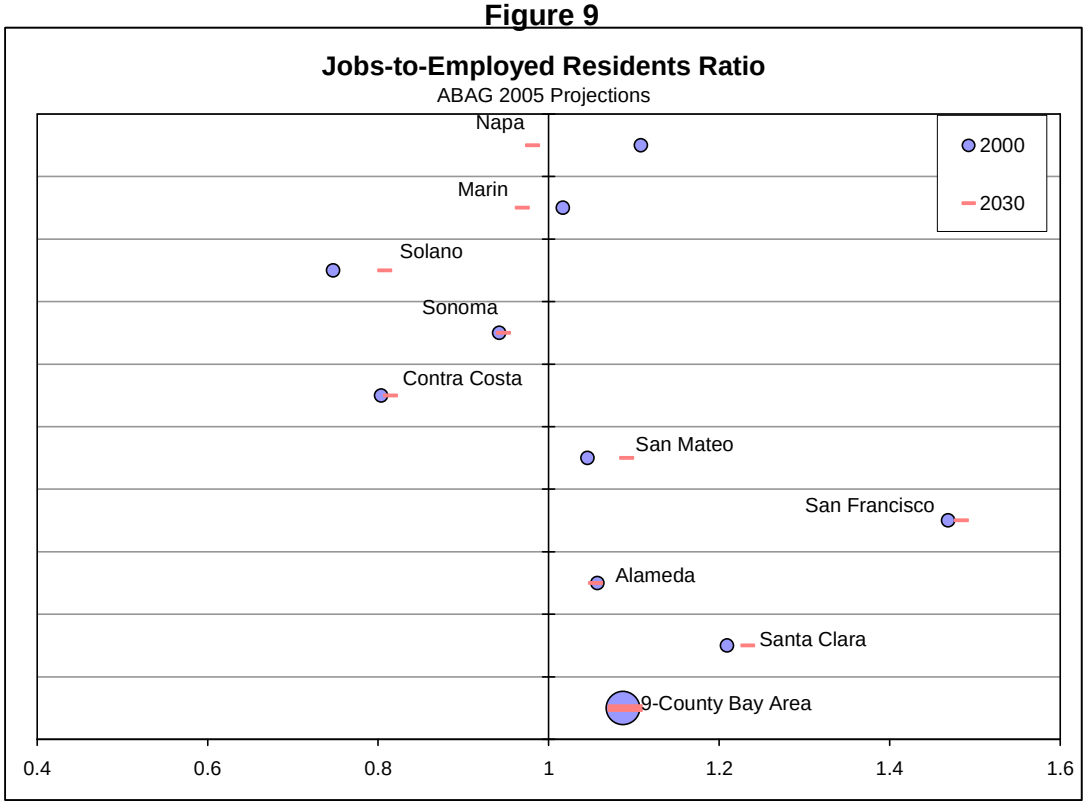
Jobs-to-Employed Residents Ratio
ABAG 2005 Projections
Napa
Marin
Solano
Sonoma
Contra Costa
San Mateo
San Francisco
Alameda
Santa Clara
9-County Bay Area
2000
2030
0.4
0.6
0.8
1
1.2
1.4
1.6

Figure 10

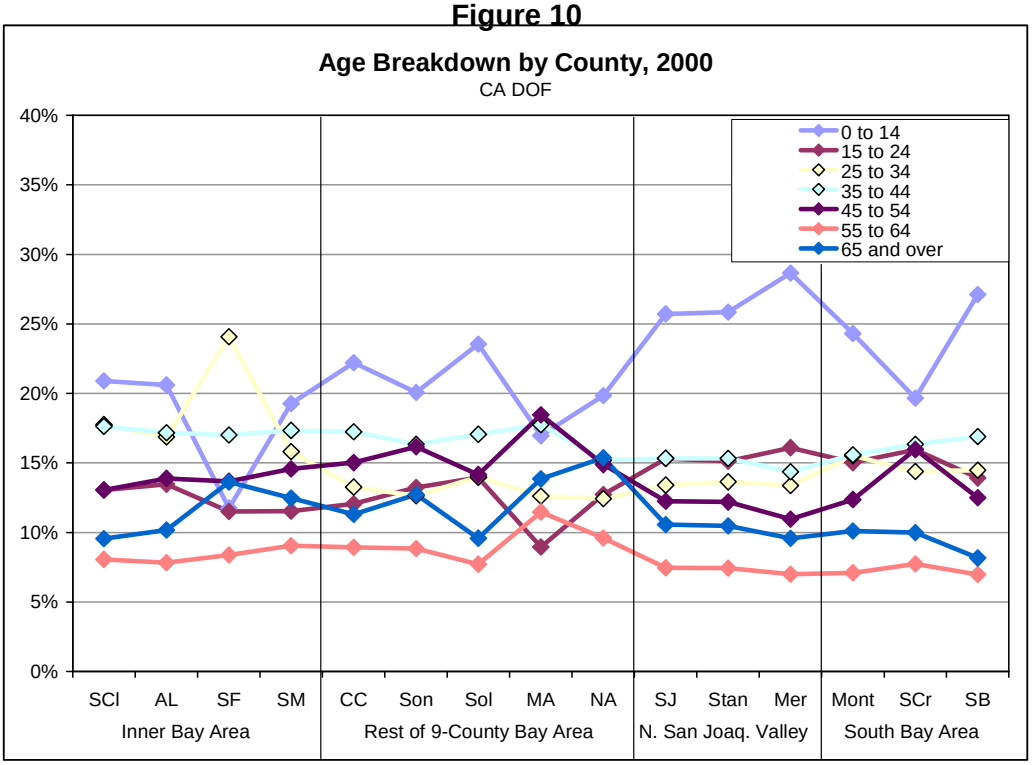

Figure 11

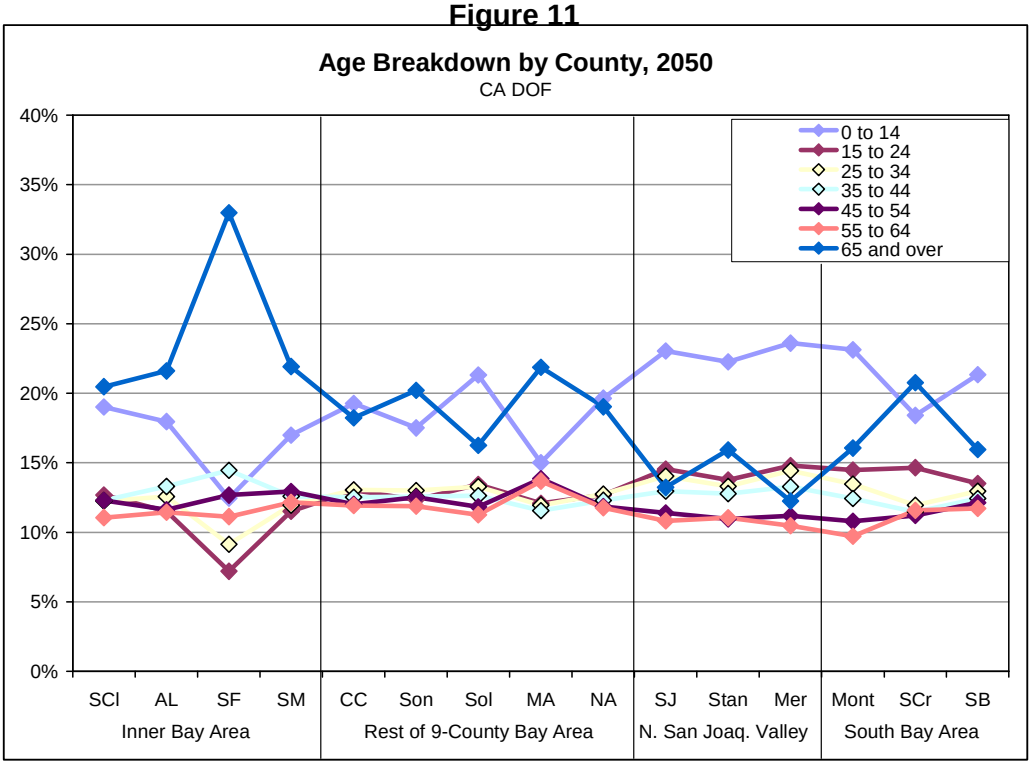

Figure 12

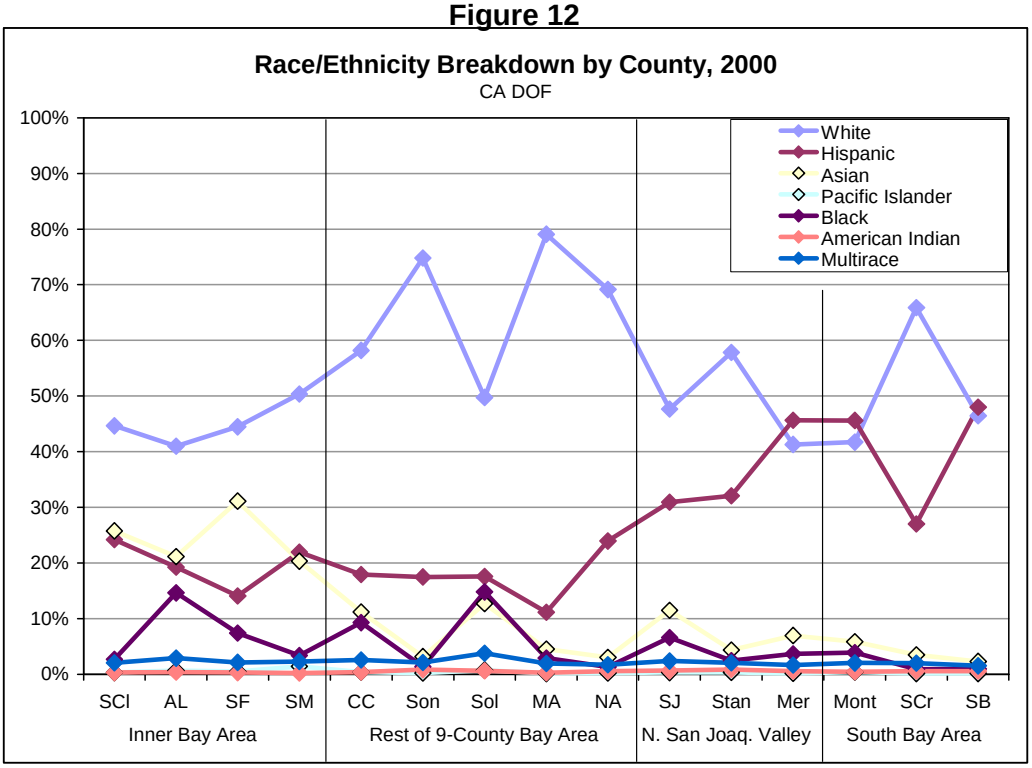

Figure 13

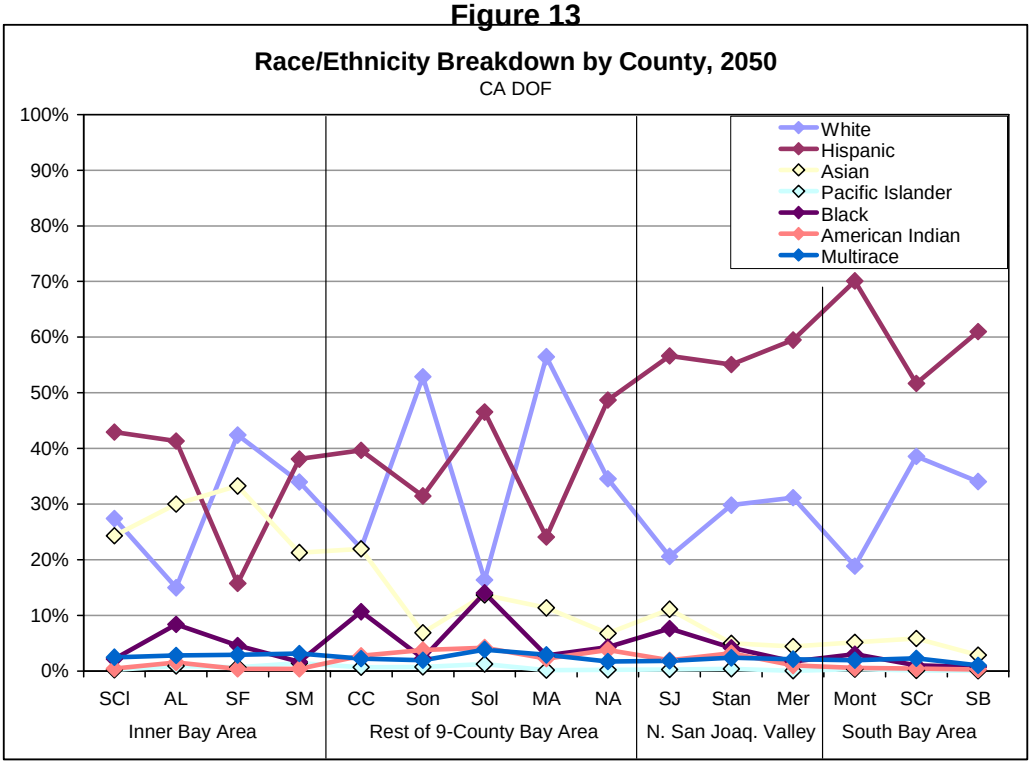

Table 1
Regional Land Acreage Summary, 2002
San Francisco Bay Area Regional Rail Plan, EPS #15023

	County Area Mapped [1]	Farmland	Urban & Built-up Land	Other Land	Water
Inner Bay Area	**1,862,449**	**40%**	**23%**	**24%**	**13%**
Santa Clara	835,226	52%	22%	25%	1%
Alameda	525,338	49%	27%	14%	10%
San Francisco [2]	148,436	0%	20%	0%	80%
San Mateo	353,449	16%	20%	46%	19%
Rest of 9-County Bay Area	**3,006,972**	**55%**	**11%**	**28%**	**6%**
Contra Costa	514,020	53%	28%	9%	10%
Sonoma	1,026,058	57%	7%	34%	2%
Solano	582,372	63%	10%	19%	9%
Marin	378,661	42%	11%	36%	12%
Napa	505,861	51%	4%	40%	4%
N. San Joaquin Valley	**3,043,359**	**89%**	**6%**	**5%**	**1%**
San Joaquin	912,601	85%	9%	5%	1%
Stanislaus	869,338	87%	7%	6%	1%
Merced	1,261,420	92%	3%	4%	1%
South Bay Area	**3,296,225**	**61%**	**3%**	**36%**	**0%**
Monterey	2,121,128	61%	3%	36%	0%
Santa Cruz	285,710	15%	11%	74%	0%
San Benito	889,387	76%	1%	23%	0%

[1] Equals total county area for all counties except Stanislaus
[2] Data provided by U.S. Census Bureau

Source: California Farmland Mapping and Monitoring Program, 2002

Table 2
Development Densities by County, 2002
San Francisco Bay Area Regional Rail Plan, EPS #15023

	Households [1]	Urbanized Acres [2]	Development Density [3]
Inner Bay Area	**1,679,595**	**429,969**	**3.9**
Santa Clara	566,652	185,129	3.1
Alameda	534,718	143,598	3.7
San Francisco	325,501	30,080	10.8
San Mateo	252,724	71,162	3.6
Rest of 9-County Bay Area	**822,222**	**333,604**	**2.5**
Contra Costa	360,790	142,450	2.5
Sonoma	176,360	72,848	2.4
Solano	136,275	55,433	2.5
Marin	101,041	41,479	2.4
Napa	47,756	21,394	2.2
N. San Joaquin Valley	**424,389**	**170,267**	**2.5**
San Joaquin	198,844	80,360	2.5
Stanislaus	156,933	56,817	2.8
Merced	68,612	33,090	2.1
South Bay Area	**232,317**	**92,597**	**2.5**
Monterey	124,722	54,062	2.3
Santa Cruz	90,891	31,097	2.9
San Benito	16,704	7,438	2.2

[1] Woods & Poole Economics, *2005 State Profile California*
[2] California Farmland Mapping and Monitoring Program, 2002
[3] Households per Urbanized Acre

Source: Calculated by Economic and Planning Systems, Inc.

Table 3
Estimated Demand for Jobs Near Transit, 2000 & 2030
San Francisco Bay Area Regional Rail Plan, EPS #15023

	2000 (Actual)		2030 (Estimated Demand)	
	Total Jobs	**Jobs Near Transit**	**Total Jobs [1]**	**Jobs Near Transit**
Inner Bay Area	**2,823,380**	**46.1%** **1,302,000**	**3,912,000**	**48.1%** **1,883,000**
Santa Clara	1,044,130	35.2% 368,000	1,482,000	39.8% 590,000
Alameda	750,160	43.5% 326,000	1,087,000	41.1% 447,000
San Francisco	642,500	74.1% 476,000	816,000	75.0% 612,000
San Mateo	386,590	34.1% 132,000	527,000	44.4% 234,000
Rest of 9-County Bay Area	**930,080**	**18.3%** **170,000**	**1,315,000**	**33.2%** **436,000**
Contra Costa	371,310	25.3% 94,000	536,000	35.1% 188,000
Sonoma	221,490	7.7% 17,000	321,000	31.5% 101,000
Solano	136,740	10.2% 14,000	205,000	25.9% 53,000
Marin	134,180	26.8% 36,000	164,000	39.6% 65,000
Napa	66,360	13.6% 9,000	89,000	32.6% 29,000
Total 9-County Bay Area	**3,753,460**	**39.2%** **1,472,000**	**5,227,000**	**44.4%** **2,319,000**

[1] ABAG Projections 2003

Source: MTC TOD Study, *Transit-Oriented Demand Analysis* , July 2005

Table 4
Estimated Demand for Housing Near Transit, 2000 & 2030
San Francisco Bay Area Regional Rail Plan, EPS #15023

	2000 (Actual)		2030 (Estimated Demand)	
	Total Households	Households Near Transit	Total Households [1]	Households Near Transit
Inner Bay Area	**1,673,032**	**31.3%** **524,385**	**2,147,570**	**32.7%** **701,350**
Santa Clara	565,863	23.4% 132,348	768,060	23.6% 180,920
Alameda	523,366	31.8% 166,434	675,920	35.0% 236,620
San Francisco	329,700	51.9% 170,961	402,570	53.5% 215,450
San Mateo	254,103	21.5% 54,642	301,020	22.7% 68,360
Rest of 9-County Bay Area	**792,987**	**11.2%** **89,025**	**1,039,030**	**15.4%** **160,300**
Contra Costa	344,129	14.6% 50,236	459,900	17.7% 81,460
Sonoma	172,403	7.3% 12,661	213,150	13.4% 28,580
Solano	130,403	7.6% 9,884	193,370	11.7% 22,670
Marin	100,650	13.2% 13,268	115,380	17.7% 20,390
Napa	45,402	6.6% 2,976	57,230	12.6% 7,200
Total 9-County Bay Area	**2,466,019**	**24.9%** **613,410**	**3,186,600**	**27.0%** **861,650**

[1] ABAG Projections 2003

Sources: MTC TOD Study, *Transit-Oriented Demand Analysis* , July 2005

Table 5
Inner Bay Area "Core" Inter-County Worker Flows
San Francisco Bay Area Regional Rail Plan, EPS #15023

		County of Work					
		San Fran.	San Mateo	Santa Clara	Alameda	Total [1]	Total, Commuters [2]
County of Residence	San Francisco	76.9%	10.3%	3.8%	5.0%	96.0%	19.1%
		322,009	43,306	15,868	20,834	402,017	80,008
	San Mateo	20.2%	58.2%	15.7%	4.2%	98.3%	40.1%
		71,702	206,093	55,473	14,783	348,051	141,958
	Santa Clara	1.0%	4.9%	87.8%	4.5%	98.1%	10.3%
		7,946	40,666	727,915	37,015	813,542	85,627
	Alameda	10.6%	4.9%	10.3%	66.9%	92.7%	25.8%
		72,035	33,501	69,669	453,917	629,122	175,205
	Total [1]	20.8%	14.2%	38.1%	23.1%	**96.2%**	**-**
		473,692	323,566	868,925	526,549	**2,192,732**	**-**
	Total, Commuters [2]	6.7%	5.2%	6.2%	3.2%	**-**	**21.2%**
		151,683	117,473	141,010	72,632	**-**	**482,798**

[1] Percent and number of total county employed residents working in Inner Bay Area
[2] Percent and number of total county employed residents commuting to another county in Inner Bay Area

Source: 2000 California Transportation Planning Package

Table 6
"Hub and Spoke" Inter-County Worker Flows
San Francisco Bay Area Regional Rail Plan, EPS #15023

		Inner Bay Area County of Work				Total, Emp. Res.	Total, Commuters
		San Fran.	San Mat.	S. Clara	Alameda	[1]	[2]
County of Residence	**Sonoma**	**3.6%**	0.7%	0.6%	1.1%	6.0%	**33.2%**
		8,192	1,633	1,246	2,367	13,438	**13,438**
	Marin	**24.4%**	2.1%	0.8%	3.7%	30.9%	**81.7%**
		30,894	2,614	952	4,729	39,189	**39,189**
	Contra Costa	**11.2%**	**2.1%**	**2.3%**	**21.7%**	37.3%	**88.1%**
		49,525	**9,279**	**10,145**	**95,938**	164,887	**164,887**
	Solano	**5.9%**	1.6%	0.9%	**7.2%**	15.7%	**36.4%**
		10,386	2,880	1,605	**12,588**	27,459	**27,459**
	San Joaquin	0.6%	0.7%	**3.3%**	**9.3%**	13.9%	**59.1%**
		1,194	1,434	**7,046**	**19,954**	29,628	**29,628**
	Stanislaus	0.4%	0.5%	**2.2%**	**4.0%**	7.2%	**34.5%**
		751	899	**3,822**	**6,840**	12,312	**12,312**
	Merced	0.1%	0.2%	**4.7%**	0.8%	5.8%	**23.2%**
		80	131	**3,449**	586	4,246	**4,246**
	Santa Cruz	0.5%	1.6%	**17.1%**	0.0%	19.2%	**73.2%**
		621	2,010	**21,540**	6	24,177	**24,177**
	Monterey	0.1%	0.2%	**3.5%**	0.3%	4.2%	**38.3%**
		220	378	**5,799**	533	6,930	**6,930**
	San Benito	0.4%	0.8%	**34.9%**	1.3%	37.3%	**76.9%**
		82	178	**8,054**	299	8,613	**8,613**
	Total, Emp. Res. [1]	5.9%	1.2%	3.7%	8.3%	**19.0%**	-
		101,945	21,436	63,658	143,840	**330,879**	-
	Total, Commuters [2]	19.7%	4.1%	12.3%	27.8%	-	**63.9%**
		101,945	21,436	63,658	143,840	-	**330,879**
	Sacramento [3]	0.3%	0.1%	0.3%	0.4%	1.0%	6.6%
		1,359	671	1,486	1,974	5,490	5,490

[1] Percent and number of total county employed residents working in Inner Bay Area
[2] Of all **commuting** employed residents, percent and number working in Inner Bay Area
[3] Sacramento included for reference.

Source: 2000 California Transportation Planning Package

Table 7
North Bay Area "Web" Inter-County Worker Flows
San Francisco Bay Area Regional Rail Plan, EPS #15023

		County of Work						
		Sonoma	Marin	Napa	Solano	Total [1]	Total, Commuters [2]	Sacramento [3]
County of Residence	Sonoma	82.0%	8.2%	1.3%	0.6%	92.1%	55.9%	0.1%
		184,423	18,336	3,030	1,299	207,088	22,665	196
	Marin	2.8%	62.1%	0.3%	0.5%	65.7%	9.3%	0.1%
		3,493	78,681	380	610	83,164	4,483	180
	Napa	3.7%	1.6%	77.3%	6.5%	89.1%	52.1%	0.4%
		2,146	894	44,341	3,756	51,137	6,796	227
	Solano	1.3%	2.5%	4.7%	56.8%	65.4%	19.9%	2.6%
		2,334	4,418	8,256	99,231	114,239	15,008	4,526
	Total [1]	33.0%	17.5%	9.6%	18.0%	**78.1%**	-	0.9%
		192,396	102,329	56,007	104,896	**455,628**	-	5,129
	Total, Commuters [2]	4.5%	13.4%	6.6%	3.2%	-	**27.7%**	2.9%
		7,973	23,648	11,666	5,665	-	**48,952**	5,129
	Sacramento [3]	0.1%	0.0%	0.1%	0.6%	0.8%	4.9%	84.5%
		294	267	273	3,233	4,067	4,067	453,317

[1] Percent and number of total county employed residents working in North Bay Area
[2] Of all **commuting** employed residents, percent and number working in North Bay Area
[3] Sacramento included for reference.

Source: 2000 California Transportation Planning Package

Table 8
Contra Costa-Solano-Marin "Web" Inter-County Worker Flows
San Francisco Bay Area Regional Rail Plan, EPS #15023

		County of Work					
		Contra Costa	Solano	Marin	Total [1]	Total, Commuters [2]	Sacramento [3]
County of Residence	Contra Costa	57.6%	1.5%	1.5%	60.6%	7.1%	0.3%
		254,749	6,506	6,803	268,058	13,309	1,107
	Solano	12.6%	56.8%	2.5%	72.0%	35.1%	2.6%
		22,018	99,231	4,418	125,667	26,436	4,526
	Marin	2.2%	0.5%	62.1%	64.8%	7.0%	0.1%
		2,740	610	78,681	82,031	3,350	180
	Total [1]	37.6%	14.3%	12.1%	**64.0%**	-	0.8%
		279,507	106,347	89,902	**475,756**	-	5,813
	Total, Commuters [2]	8.0%	2.3%	3.6%	-	**13.9%**	1.9%
		24,758	7,116	11,221	-	**43,095**	5,813
	Sacramento [3]	0.3%	0.6%	0.0%	0.9%	5.9%	84.5%
		1,370	3,233	267	4,870	4,870	453,317

[1] Percent and number of total county employed residents working in Contra Costa-Solano-Marin
[2] Of all **commuting** employed residents, percent and number working in Contra Costa-Solano-Marin
[3] Sacramento included for reference.

Source: 2000 California Transportation Planning Package

Table 9
N. San Joaquin Valley "Web" Inter-County Worker Flows
San Francisco Bay Area Regional Rail Plan, EPS #15023

		County of Work					
		San Joaquin	Stan.	Merced	Total [1]	Total, Commuters [2]	Sacramento [3]
County of Residence	San Joaquin	76.5%	3.1%	0.1%	79.7%	13.6%	2.9%
		163,455	6,640	163	170,258	6,803	6,296
	Stanislaus	8.2%	79.1%	2.9%	90.2%	53.2%	0.4%
		13,993	134,529	4,962	153,484	18,955	749
	Merced	1.4%	12.0%	75.0%	88.4%	53.6%	0.3%
		998	8,827	55,021	64,846	9,825	202
	Total [1]	39.0%	32.8%	13.2%	**85.0%**	-	1.6%
		178,446	149,996	60,146	**388,588**	-	7,247
	Total, Commuters [2]	14.4%	14.9%	4.9%	-	**34.2%**	7.0%
		14,991	15,467	5,125	-	**35,583**	7,247
	Sacramento [3]	1.4%	0.1%	0.0%	1.4%	9.3%	84.5%
		7,317	393	45	7,755	7,755	453,317

[1] Percent and number of total county employed residents working in N. San Joaquin Valley
[2] Of all **commuting** employed residents, percent and number working in N. San Joaquin Valley
[3] Sacramento included for reference.

Source: 2000 California Transportation Planning Package

Table 10
South Bay Area "Web" Inter-County Worker Flows
San Francisco Bay Area Regional Rail Plan, EPS #15023

		County of Work				
		Santa Cruz	Monterey	San Benito	Total [1]	Total, Commuters [2]
County of Residence	Santa Cruz	73.8%	4.1%	0.5%	78.4%	17.5%
		93,084	5,164	622	98,870	5,786
	Monterey	4.6%	89.0%	0.7%	94.4%	48.6%
		7,601	146,444	1,187	155,232	8,788
	San Benito	3.1%	7.0%	51.5%	61.6%	20.7%
		714	1,606	11,909	14,229	2,320
	Total [1]	32.3%	48.8%	4.4%	**85.5%**	-
		101,399	153,214	13,718	**268,331**	-
	Total, Commuters [2]	13.3%	10.9%	2.9%	-	**27.1%**
		8,315	6,770	1,809	-	**16,894**

[1] Percent and number of total county employed residents working in South Bay Area
[2] Of all **commuting** employed residents, percent and number working in South Bay Area

Source: 2000 California Transportation Planning Package